DOCUMENT RESUME

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ABSTRACT

This document contains 123 papers from an international conference on vocational education and training (VET) for lifelong learning in the information era. The papers focus on the following themes: (1) societal and ethical issues; (2) human resource development and personnel training; (3) international issues; (4) information technology in VET; (5) partnership for VET; (6) program development; and (7) skills for the new

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millennium. The following are among the subthemes addressed in the individual papers: manpower planning; social issues; cross-border and culture issues; partnership issues; modeling and process; future directions; training effectiveness; language teaching; curriculum development and competency; curriculum and standards; leadership and professional development; distance education; program development; new information technology initiatives; teacher training; workplace initiatives; program outcomes; teaching and learning; VET in the workplace; modeling and training; teaching practice and assessment; educational approaches; industrialization and technological change; learning systems; management and planning; program design and teaching; competency and benchmarking; technological issues; knowledge development in VET; Web-based learning; impacts of VET; strategies and partnerships; pedagogical issues; skill testing, work-based training, and industrial partnerships; and international and multinational issues. Most papers contain substantial bibliographies. (MN)

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Vocational Education and Training for Life Long Learning in the Information Era

IVETA Conference 2000 Proceedings

Hong Kong

6 - 9 August 2000

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The following four authors' papers were not on the Proceedings CD.

Session C 1 - Gerald Winnington-Ingram

Session E 6 - Dudu M. Dlanini

Session F 11 - Klaus Sodemann

Session G 4 - Victor C. H. Tsang

IVETA 2000
HONG KONG
Life Long Learning in the Information Era

6 - 9 August 2000
Hong Kong Convention & Exhibition Centre
Hong Kong

Programme Schedule & Delegates List

Organisers :

Vocational Training Council 職業訓練局

IVETA

IVETA Conference 2000

Programme Schedule
&
Delegates List

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PROGRAMME SCHEDULE

		KEYNOTE SPEECHES	**BREAK**	**PAPER PRESENTATIONS**	**LUNCH**	**PAPER PRESENTATIONS**	**BREAK**	**PAPER PRESENTATIONS**	
Time / Date	9:00 am ↓ 9:30 am	9:30 am ↓ 11:00 am	11:00 am ↓ 11:15 am	11:15 am ↓ 12:45 pm	12:45 pm ↓ 2:15 pm	2:15pm ↓ 3:45 pm	3:45 pm ↓ 4:00 pm	4:00 pm ↓ 5:30 pm	Evening
Monday 7 August 2000	**OPENING CEREMONY**	**Hall 201A** 1 Mrs Fanny LAW 2 Mr K Y YEUNG 3 Prof Binglin ZHONG		Session 1 201A B1 202 A1 204 C2 207 E3 211 F2	**Hall 301** Speech by Mr Moses CHENG & Mr Tony PANG	Session 2 201A C1 202 A2 204 B2 207 D4 211 F3		Session 3 201A F1 202 A3 204 B3 207 D2 211 E6	**WELCOME RECEPTION 6:00 pm**
Tuesday 8 August 2000		**Hall 201A** 1 Ms Heather CRAWFORD 2 Prof David H MONK		Session 4 201A D1 202 B4 204 E4 207 F4 211 F7	**Hall 301** Speech by Mr Daniel HULL	Session 5 201A E1 202 B5 204 F5 207 F8 211 G3		Session 6 201A E2 202 B6 204 F6 207 F9 211 G4	**CONFERENCE DINNER 6:30 pm**
Wednesday 9 August 2000		**Hall 201A** 1 Dr Johanna LASONEN 2 Prof LEE Ngok		Session 7 201A G1 202 D3 204 D5 207 E5 211 F12	**Hall 301** Speech by Hon Timothy FOK	Session 8 201A G2 202 G5 204 C3 207 F11 211 F10		**WRAP UP SESSION AND CLOSING CEREMONY**	

KEYNOTE SPEECHES

The Conference will feature leading practitioners in the vocational education and training field as Keynote Speakers:

Mrs. Fanny LAW, J.P.
Secretary for Education and Manpower
The Government of the Hong Kong Special Administrative Region

Mr. K. Y. YEUNG, CBE, J.P.
Chairman
Vocational Training Council, Hong Kong

Professor Binglin ZHONG
Director General, Department of Higher Education
Ministry of Education, China

Ms. Heather CRAWFORD
National President
Australian Technical and Further Education
and
College Director
Bankstown College of TAFE NSW, Australia

Professor David MONK
Dean, College of Education
Pennsylvania State University, USA

Dr. Johanna LASONEN
President
International Vocational Education and Training Association
and
Senior Researcher
University of Jyväskylä, Institute for Educational Research, Finland

Professor LEE Ngok, J.P.
Executive Director
Vocational Training Council, Hong Kong

LUNCHEON TALKS

The Conference will arrange talks during the luncheon sessions of the Conference. Speakers included:

Mr Moses Mo-chi CHENG, OBE, J.P.
Honorable Advisor
eSchool Limited, Hong Kong

Mr Tony PANG
General Manager
eSchool Limited, Hong Kong

Mr Daniel HULL
President/CEO
CORD, Texas, U.S.A.

The Honourable Timothy FOK, SBS, J.P.
Ex-Member
Legislative Council
and
President
Sports Federation & Olympic Committee of Hong Kong, China

PAPER PRESENTATIONS

The technical papers will be delivered over 3 days in 8 sessions, each having 5 parallel sub-sessions. There will be 3 presentations in each parallel sub-session, whose theme is denoted by the following:

A. Social and Ethical Issues

B. Human Resource Development and Manpower Training

C. International Issues

D. IT in Vocational Education Training

E. Partnership for Vocational Education and Training

F. Programme Development

G. Skills for the New Millenium

Titles of the papers and the names of the authors and session chairmen are shown overleaf.

SESSION SCHEDULE

SESSION 1 **7 AUGUST 2000** **11:15 AM - 12:45 PM**

Room No	Paper No	Sub-theme/Paper Title	Session Chairman/Author(s)
201A		**B1 Manpower Planning**	**Dan HULL**
	001	Use of Social and Economic Modeling to Plan Vocational Education and Training	David L PASSMORE
	002	Retraining for the Unemployed – An Up-Hill Battle that Never Ends	S S KWONG
	003	Manpower Planning in Hong Kong	Anthony CHENG
202		**A1 Social Issues**	**Leila LAHTI**
	004	Attitudes of University Faculty Members toward Students with Disabilities	Marie F KRASKA
	005	Attitude of Gaming Employees towards Problem Gambling: How It Affects their Learning at an Awareness Training	Lisa M BYBEE
	006	Quantitative Evaluation of the Educational Programmes on Students' Awareness of Social Responsibility	Loky TSUI LEE WONG Sau Wan, Teresa
204		**C2 Cross Border/Culture Issues**	**Victor K A GBOMITA**
	007	Cross Border Activities to Strengthen Technical and Vocational Education and Training Systems in the Information Era	Di BOOKER L Efison MUNJANGANJA Sarah HAYMAN
	008	The Competency of Cross-Culture of Expatriates in the Multinational Corporation	S T TSAI Shu-Hsiao TSEN
	009	Provision of Professional Training to Meet Global Procurement Challenges in Hong Kong	Chi-Shun KEA, Josephine
207		**E3 Partnership Issues**	**Christopher PARKIN**
	010	Cross Disciplinary Continuing Professional Development	Sai-Hong KO
	011	Mobility, Flexibility and Accessibility of Post-Secondary Education in Hong Kong	Shui-Kin CHAN
	012	Vocational Education in Engineering in the Information Age	C W WOO S T TANG, Alan Sultana T POPOSKA
211		**F2 Modelling and Process**	**H H LEUNG**
	013	A Perception of the Software Process Model	Albert H S SCOTT
	014	Design of Internet-Related Courses for IT Professionals	Yiu-Kuen CHOI
	015	A TQM Study of Faculty and Trainees' Perceptions of Public Vocational Training Institutions in Taiwan	Li-Mei HUANG

SESSION SCHEDULE

SESSION 2 **7 AUGUST 2000** **2:15 PM - 3:45 PM**

Room No	Paper No	Sub-theme/Paper Title	Session Chairman/Author(s)
201A		**C1 Future Directions**	**Marie KARSKA**
	016	The Impact of Globalisation and the Changing Nature of Work on Vocational Education and Training	Chris ROBINSON
	017	Driving Revenue Online: Appropriate Technologies for Education Institutions to Develop Online Classes?	Gerald WINNINGTON-INGRAM
	018	In Search of a Governance Framework of Vocational Education and Training for the 21st Century: An International Comparative Study	Hing-Lap HUNG, Humphry
202		**A2 Social Issues**	**Paul KRUEGER**
	019	Increasing Female Participation in Technology Education: A Hong Kong Perspective	Kenneth S VOLK
	020	Integration of General Education into the Vocational Training Curriculum	Kwok-Hung LAI
	021	Flexible Learning: Developing Opportunities	Lesley WEMYSS Carmel THOMPSON
204		**B2 Training Effectiveness**	**Frederick FOURIE**
	022	Identifying and Responding to Skills Shortages	David L PASSMORE
	023	Analysis of Training Needs for Employees of International Five-Star Hotels in Taipei, Taiwan	Shu-Hsiao TSEN
	024	An Evaluation on the Effectiveness of a 9-Month Intensive Full-Time Program for the Unemployed	Che-Keung YEUNG Y K CHAN, Cadbury L L CHOW, Lilian Y B LEUNG K C CHOW, Joseph
207		**D4 Language Teaching**	**Volker PAUL**
	025	Using the Web to Enhance Language Teaching and Learning and Distributed Cognitions in a Conventional Sub-Degree Setting	W Y LAU, Wanda
	026	The Effectiveness of Using Technology to Teach English as a Second Language	Yuk-Kwan NG, Rita
	027	Web-Based Vocational English: Development, Practice and Problems	Martina CHAN Chi-Ming LEE
211		**F3 Curriculum Development and Competency**	**James KUNG**
	028	Curriculum Development in Vocational Education: Achieving Balance and Coherence	Christopher PARKIN
	029	Providing Competency-Based Education for Industry and Its Effect on Classroom Education	Chin-Yen LIN Tsung-Juang WANG
	030	Competency Based Training: An Evaluation of a Post-Secondary Teacher Education Program	Dale E THOMPSON Betsy ORR Cecelia THOMPSON

SESSION SCHEDULE

SESSION 3 **7 AUGUST 2000** **4:00 PM - 5:30 PM**

Room No	Paper No	Sub-theme/Paper Title	Session Chairman/Author(s)
201A		**F1 Curriculum and Standards**	**Maida GRANT**
	031	Using Quality Indicators to Create World Class Curricula: From Concept to Application	Curtis FINCH Timo LUOPAJARVI Paivi SUTINEN
	032	What is Missing from ISO 9000 International Quality Standards Training in the United States?	Paul KRUEGER
	033	West Virginia Instructional Technology Program Design for Economic Development	Michael Malone MURPHY
202		**A3 Ethical and Social Issues**	**Anthony CHENG**
	034	Role of Supported Services in the Provision of Vocational Training for Open Employment to People with Disabilities in Hong Kong	LO CHAN Woon Ching, Eliza
	035	Exploration of the Aboriginal Vocational Training Implementation Stratagem from the Outlook of the "Tribal Classroom"	Chin-Hung CHOU
	036	Professional Ethics – A Life-Long Pursuit by an Engineer	C K LEUNG Jolly WONG
204		**B3 Leadership and Professional Development**	**Peter Le CORNU**
	037	An Examination of the Concept of Providing Leadership Development for All Students as an Integral Part of Classroom Instruction	Jerome I LEVENTHAL
	038	Contingency Theory is of Little Value in Helping Leaders or Potential Leaders to Perform Successfully	Shing-Kwong CHENG, Eric
	039	Continuing Professional Development towards Employee Empowerment in Manpower Training: A New Domain of Organisational Strategy	S L YIP, Joseph
207		**D2 Distance Education**	**Graham ATTWELL**
	040	A Joint Venture in Distance Education Program between Hong Kong and Australia	Fun-Ting CHAN John MESSING
	041	An Evaluation of a Model Multiple Site Distance Learning Program for Non-Traditional Students	Dale E THOMPSON Betsy ORR Kit BROOKS Cecelia THOMPSON
	042	How to Teach Students in the Information Era?	K C CHU
211		**E6 Program Development**	**John CHAN**
	043	Developing a Competitive Program to Cope with the 3C (Change, Competitive, Complex) Trend in Industry	S T TSAI Shu-Hsiao TSEN
	044	How Effective are Our Teaching Methods for Vocational Education	Yik-Lung WONG, Lawrence
	121	Transforming Further Education and Training in Kwazulu-Natal, South Africa	Dudu M DLAMINI

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SESSION 4 **8 AUGUST 2000** **11:15 AM - 12:45 PM**

Room No	Paper No	Sub-theme/Paper Title	Session Chairman/Author(s)
201A		**D1 New IT Initiatives**	**Jean Decker MATHEWS**
	046	Adapting the System of Continuing Vocational Education for the 3rd Industrial Revolution - Experiences from the Swedish Pilot Project with AVE	Mats LINDELL
	047	A Flexible Investment: The Australian VET Sector's Framework for Applying New Technologies in Learning	Sandra LERCH Peter Le CORNU
	048	E-Portfolio: More Than an Electronic Resume	N Faye ANGEL
202		**B4 Teacher Training**	**David L PASSMORE**
	049	Assessment and Preparation of Career and Technical Education Teachers: Implications for Curriculum Development	Victor K A GBOMITA
	050	What's Happening in Your Teacher Education Program?	C Gloria HEBERLEY
	051	Stress Management for Teachers in Vocational Education and Training Sector	Ching-Wah CHAN, Gloria
204		**E4 Workplace Initiatives**	**F T CHAN**
	052	The Engineering Graduate Training Scheme and New Technology Training Scheme in Hong Kong	T L NG M Y WONG, Gary
	053	Vocational Education and Training for Operators of Modern Enterprises	Qin-Xiang GAO Mei-Chi HUANG He-Ping YU
	054	The Condition and Competency of Multi-Entrances for Personnel Training of Industrial Design Engineer in Taiwan	Jui-Che TU
207		**F4 Programme Outcomes**	**Sarah HAYMAN**
	055	Perceptions of Participants in a Multi-Site Distance Learning Bachelor of Science Degree Program	Betsy ORR Dale E THOMPSON Cecelia THOMPSON
	056	A Study of Relation between Assessment Dimension and Management Outcomes - A Sample of Sinyi Real-estate Company	Tsan-Ying LIN, Stanley
	057	Exploring a New Pattern of Vocational Education and Training	Hai-Cheng YANG Ting-Rui WANG
211		**F7 Teaching and Learning**	**Bruno GELONESI**
	058	Telling Stories in the Use of Portfolio Assessment in Higher Education: Some Implementation Issues	Annie Y W NICHOLSON Sharon L BRYANT W F NG, Judy
	059	The Effects of the Whole Educational Experience on Graduate Employability and Further Study	Kwok-Hung LAI Michael John POMFERT
	060	Flexible Learning Programme in Vocational Education: A Case Study	Yik-Lung WONG, Lawrence Nigel J MONTAGUE

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SESSION SCHEDULE

SESSION 5 **8 AUGUST 2000** **2:15 PM - 3:45 PM**

Room No	Paper No	Sub-theme/Paper Title	Session Chairman/Author(s)
201A		**E1 VET/Workplace Interactions**	**Jeanette DAINES**
	061	School, TAFE and University Links. In Pursuit of a Seamless Pathway	Robert PLAYER
	062	Work-Based Training: Experiences of Student Interns	Marcelle HARDY Carmen PARENT Johanne FORGET
	063	A New Model for Workforce Development: University of Nevada Las Vegas Educator Externship Programm	Sterling SADDLER Gina M TOTH Lisa M BYBEE
202		**B5 Modelling and Training**	**Mitzi LEUNG**
	064	Mining Labour Market Information for Use in Developing an IT Manpower Predictive Model	Gar-Yun SUEN, Garry
	065	Training for Betterment: A Model for Training of Professionals in a Diverse Organistion	Freidoon A KHAVARPOUR Bruno GELONESI
	066	E-Learning in Knowledge-Based Society	P F TSUI K M YUE, Ian
204		**F5 Teaching Practice and Assessment**	**Archibald M FLEMING**
	067	Transforming Educational Practice for a Transformed Employment Environment	Jeanne DAWSON
	068	Pre- and Post-Assessment in Occupational Courses	Teresa YOHON
	069	Transforming Young School Leavers and Mature Unemployed into Skilled	Yat-Chuen LI
207		**F8 Educational Approaches**	**S P FU**
	070	Discovery Learning Approach to Classic Electrical Machines Principles	S K WONG K F CHAN T W CHAN, David
	071	Research and Practice of Higher Vocational Education of Environmental Engineering	Ya-Lei ZHANG
	072	The Use of a Laboratory Approach for Teaching Engineering Students	Yik-Lung WONG, Lawrence
211		**G3 Industrialization and Technological Change**	**Edgar I FARMER**
	073	Industrialization, The New Economy, and the Occupational Work Ethic	Gregory C PETTY
	074	Tele-Operation of a Manufacturing System for Vocational Education	F H F TSANG J K F LEE
	075	Worldwide Technology Trend of Electronic Products	Lawrence CHEUNG

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SESSION 6 **8 AUGUST 2000** **4:00 PM - 5:30 PM**

Room No	Paper No	Sub-theme/Paper Title	Session Chairman/Author(s)
201A		**E2 Learning Systems**	**Kenneth NG**
	076	Workplace Learning as an Investment in Human Capital	Johanna LASONEN Reijo PARIKKA
	077	Supporting Lifelong Learning – The New Integrated Scottish Qualifications System	Maida GRANT
	078	Key Policy Issues in the Promotion of Information Technology in Vocational Education: Some Lessons from the Five-Year Strategy in Hong Kong	Kathleen S K NG
202		**B6 Management and Planning**	**Klaus SODEMANN**
	079	The Development of a Management Competency Model and a Development Centre	Sara WONG
	080	Graph Theory, Job-Labour System and Manpower Planning	Kwai-Wing LEUNG
	081	Overview of Assessment and Quality Assurance Systems on TVET and a Proposal for Turkey	Sabahatting BALCI Riza GURBUZ
204		**F6 Programme Design and Teaching**	**P F TSUI**
	082	Discussion and Design of High Vocational Education	Wen-Yi QIN Yan-Chun GUO
	083	Teaching Statistical Problem Solving in Vocational Education	Ken W LI
	084	Structure and Cultivation of the Knowledge and Abilities of Students of Higher Vocational Technical Education	Ji-Yao ZHOU Kai-Yu ZHEN Wei-Hua LIU
207		**F9 Competency and Benchmarking**	**Teresa YOHON**
	085	The Practice Firm Concept - A Competency Approach to Teach Key Business Skills	Mitzi LEUNG W F NG Judy
	086	Benchmarking in Supply Chain Management: A Process to Find a Better Way, Rather than an Attempt to Reinvent the Proverbial Wheel	Y L TAM, Eric
	087	Vocational Education and Training for Hong Kong into the 21st Century, An Investigative Report	Man-Wey LEUNG, Joseph
211		**G4 Technological Issues**	**Francis H F TSANG**
	088	The Implication of Advances in Wireless Data Communications on E-Commerce	Lawrence CHEUNG
	089	New Roles of Vocational Education and Vocational Teachers for Technological Change: A Case Study of the Hong Kong Institute of Vocational Education	Che-Keung YEUNG Alice CHENG Alfred KOO
	090	Media in Transition - Refining the Skill Set	Victor C H TSANG

SESSION SCHEDULE

SESSION 7 | **9 AUGUST 2000** | **11:15 AM - 12:45 PM**

Room No	Paper No	Sub-theme/Paper Title	Session Chairman/Author(s)
201A		**G1 Knowledge Development in VET I (Concepts & Approaches)**	**Chris ROBINSON**
	091	Research on Vocational Education and Training as a Field for Knowledge Development – Starting Points for the CEDEFOP Research Arena	Pekka KAMARAINEN
	092	Knowledge Development at the Interface of Research, Policy and Practice - Support for Knowledge Development within the CEDEFOP Research Arena (CEDRA)	Graham ATTWELL Alan BROWN
	093	Use of Web-Based Collaboration and Knowledge Transformation Tools to Support the Development of a Learning Community to Enhance Careers Guidance Practice	Alan BROWN Graham ATTWELL Jenny BIMROSE
202		**D3 Web Based Learning**	**George COPA**
	094	Integrating Adult Learning Principles in Web Based Open Learning	Shyamal MAJUMDER
	095	Integrating the Strengths of the Web-Based and Traditional Models of Teaching	T Y LEUNG Y S TRAN, Sarah
	096	Web-Site Teaching: Analysis of Its Future Development	Ying-Wai CHIU, Peter
204		**D5 IT Impacts**	**C M LEUNG**
	097	Establishing a Virtual Building and Construction Site for Education and Training	John F BARRETT Brian WILKINS
	098	The Webvolution's Impact on Vocational Classrooms and Administration	Elaine S Stith
	099	Audio and Video Development for Multimedia and Web-Based Applications	Teresa YOHON
207		**E5 Strategies and Partnerships**	**Esham SAMIN**
	100	Establishment of the Advanced Printing Technology Centre at Hong Kong Institute of Vocational Education (Kwun Tong)	Lawrence W CHAN
	101	Profile of SME Support in Hong Kong and the Setting up of the Business Start-Up Centre	Robin WONG
	102	Attach Strategic Importance to High Quality Vocational and Technical Education	Sheng-Yun YANG
211		**F12 Pedagogical Issues**	**Philip LOOTS**
	103	Determining What to Teach	Robert E NORTON
	104	Teaching Evaluation – A Complicated Issue	Z LIN, John K H CHAN Q L XUE
	105	Program Quality and Flexible Mode Delivery: Bachelor of Health Sciences (Aboriginal Health and Community Development): A Case Study	Bruno GELONESI Freidoon A KHAVARPOUR

SESSION SCHEDULE

SESSION 8 **9 AUGUST 2000** **2:15 PM - 3:45 PM**

Room No	Paper No	Sub-theme/Paper Title	Session Chairman/Author(s)
201A		**G2 Knowledge Development in VET II (Dissemination and Impact)**	**Pekka KAMARAINEN**
	107	Doing the Research is Only Half the Job: The Impact of VET Research on Decision Making	Chris ROBINSON Sarah HAYMAN
	108	NCVER'S Web Site and the VOCED Research Database	Sarah HAYMAN
	106	The Renaissance of Vocational Education and Training: Miscellaneous Hints for Undernourished Elephants Yearning to Dance	Robert J SADLER
202		**G5 Skill Testing, WBT and Industrial Partnerships**	**Robin WONG**
	109	The Occupational Skill Testing and Certification Systems in Hong Kong	Siu-Pun FU
	110	Distance and Open Learning - Web-based Training (WBT) Development Process Consideration	Wing-Yiu LAU, Donna
	111	Industry Partnership for Graduation Stage of Higher Vocational Education	Dan-Dan SHI Xiao-Hong CHEN
204		**C3 Inter and Multi-national Issues**	**Curtis FINCH**
	112	From 20th Century Education and Training to 21st Century Skills Enhancement	Archibald M FLEMING
	113	Regional Integration of TVET Systems among Small Island States: Caribbean Initiatives	Tom MCARDLE
	114	Thirsty Horses and Public Waterholes	Joyce Marie TURNBULL
207		**F11 Programme Development**	**Gregory PETTY**
	115	New Designs for Career and Technical Education Programs at the Secondary and Postsecondary Levels in the United States: Context, Audience, Signature, and Expectations	George H COPA Sharon GROSSBACH
	116	German International Cooperation in Technical and Vocational Education and Training	Klaus SODEMANN
	117	Determining What Materials to Develop	Robert E NORTON
211		**F10 Programme Development**	**Alfred KOO**
	118	Qualitative Measures of the Responsiveness of Postsecondary Technical Programs to the Needs of Industry	Edgar I FARMER
	119	Global E-Learning: Tendencies and Possibilities of Using the Internet for Vocational and Education Training	Armin VON GRUCHALLA Frank STAUCH
	120	A Comparative Study on the Strengths and Weaknesses of the Students between China and Hong Kong	Brian H M O N K LEUNG, Dennis

DELEGATES LIST

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Ms Louise GODWIN	TAFENSW	Australia
Ms Sarah HAYMAN	National Centre for Vocational Education Research	Australia
Mr Peter LE CORNU	Canberra Institute of Technology	Australia
Mr Robert PLAYER	Hunter Institute of Technology	Australia
Mr Gary RENSHAW	TAFENSW	Australia
Mr Christopher ROBINSON	National Centre for Vocational Education Research	Australia
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Name	Organisation	Country/Territory
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Prof Yanchun GUO	VTC Zhengzhou University	China
Prof Tao JIANG	East China Normal University	China
Prof Xiaoqing NI	Nanjing Forestry University	China
Prof Wenyi QIN	VTC Zhengzhou University	China
Prof Dan Dan SHI	Zhejiang University of Technology	China
Ms Xiao Min WANG	Panyu Polytechnic	China
Ms Lida WEI	Panyu Polytechnic	China
Prof Haicheng YANG	Northwestern Polytechnic University	China
Mr Shengyun YANG	Technical Institute of Xiamen University	China
Prof Heping YU	North Jiao Tong University	China
Prof Fengluan ZHANG	Tongji University	China
Dr Yalei ZHANG	Institute of Technology Tongji University	China
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Mr Armin VON GRUCHALLA		Germany
Mr Klaus SODEMANN	GTZ	Germany
Mr Frank STAUCH	a.i.m. Gmbh	Germany
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IVETA 2000
HONG KONG
Life Long Learning in the Information Era

6 - 9 August 2000
Hong Kong Convention & Exhibition Centre
Hong Kong

Keynote Speeches

Organisers :

Vocational
TRAINING COUNCIL
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IVETA

KEYNOTE SPEECHES

The Conference will feature leading practitioners in the vocational education and training field as Keynote Speakers:

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Secretary for Education and Manpower
The Government of the Hong Kong Special Administrative Region

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Chairman
Vocational Training Council, Hong Kong

Professor Binglin ZHONG
Director General, Department of Higher Education
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Professor LEE Ngok, J.P.
Executive Director
Vocational Training Council, Hong Kong

IVETA 2000 CONFERENCE
6-9 August 2000

Mr K Y YEUNG, CBE, J.P.
Chairman
Vocational Training Council
Hong Kong

Dr Lasonen, Mrs Law, Professor Zhong, distinguished guests and delegates.

It is with great pleasure that I address you at the opening of the IVETA Conference 2000.

Mrs Law emphasised the importance of vocational education and training in the twenty-first century. In particular, she highlighted the nature of our knowledge-based society and the crucial importance of three core generic skills, namely, communication, numeracy and information technology. I will, later, spend a little time describing how the VTC addresses these, but first I would like to provide a few facts and figures about the VTC as Hong Kong's major provider of vocational education and training.

The VTC was established in 1982 by statute and is subsidised by the Government to the tune of HK$2.2 billion a year or 85% of total annual recurrent expenditure. It has both executive and advisory functions. Its main objective is 'to provide high-quality, cost-effective vocational education and training which is directly applicable to the requirements of Hong Kong's employers and the community'.

To meet its objective the VTC establishes very close links with employers through an extensive network of representation on its Training Boards and other advisory groups, uses labour market intelligence, and provides a flexible programme of education and training courses which can respond readily to changing social and economic circumstances. To undertake its tasks the VTC runs nine vocational education institutions, 26 training, development and skills centres, an Apprenticeship Unit and a Continuing Professional Development Centre. Some 120 000 students and trainees are educated and trained annually by the VTC, served by around 4 000 staff.

The VTC offers pre-employment as well as in-service education and training courses, both full-time and part-time, ranging in level from post-secondary 3 courses to sub-degree programmes. Thus, the part the VTC plays in the community is considerable. This is reflected in its role, size, the significant commitment of public funds by the Government, and the length, breadth and variety of courses it provides.

The VTC always strives to respond to all relevant Government and community requirements, and socio-economic changes. This is best illustrated by describing some of the major factors influencing the change in the provision of vocational education and training over the past three years and how the VTC has been responding to them.

First, during that period of time, a factor which has influenced Hong Kong considerably was the financial crisis which hit the region. After a decade of impressive economic growth and full employment, Hong Kong, in common with its neighbours, experienced an unprecedented economic setback and unemployment. This coupled with setbacks in public spending, has affected the VTC in two ways. We have to become much more cost-effective without significantly affecting the quality of our services, and we have had to identify more closely the education and training needs of the unemployed, particularly school-leavers, to enable them to compete for jobs in a more competitive and demanding labour market.

Secondly, in common with other developed societies, over the past decade or so Hong Kong has experienced a shift out of direct manufacturing into manufacturing support and into such service industries as banking, insurance, tourism and other trade and finance related activities. A common requirement of these service industries is the possession of increasing high language and IT skills.

We coped with cutbacks in public spending by regrouping the provision of vocational education under a single Institute of Vocational Education and doing away with training courses which are no longer relevant. We achieved considerable savings, some of which has been redirected towards new training programmes required by employers. In this process of re-prioritisation we have also taken the opportunity to strike a better deal with the Government by way of a new Memorandum of Administrative Arrangements. The most significant aspect of the MAA relates to financial arrangements. In common with many Government subvented organisations throughout the world, the VTC has been funded on a deficiency grant basis, that is, an annual sum is granted representing the differences between approved spending and approved estimates of fee income, and any unspent funds must be returned to Government. This arrangement does not encourage cost saving and stifles initiative, as funding is not available for quick investment in new services.

Our MAA with the Government now allows the VTC to be funded through a discretionary grant whereby, annually, the VTC can keep up to 15% of any real savings it achieves, and to use the funds for new activities, for example, experimental training courses. Such an arrangement encourages cost-effectiveness and initiative. The MAA also goes into detail about triennial and annual planning and budgeting, as well as measures by which we measure our performance.

We believe that the MAA and, in particular, the introduction of the discretionary grants is a considerable boost to the VTC's operation and very much in the interest of progress in vocational education and training. As such, we recommend that those organisations present at the conference who may be funded on the deficiency grant basis might encourage their funding masters to consider the discretionary grant approach.

In recognition of the shift from manufacturing to the services industries, the VTC has nearly halved the number of places on its engineering and manufacturing craft courses and reduced its apprenticeship provision, replacing them with more generic service-biased Certificates in Vocational Studies, plus new trainee places on programmes for the hospitality group of industries and for mechanical and electrical services.

Thirdly, with regard to the acceleration of IT in the economy, the VTC has enhanced the relevant training centre to became an IT Training and Development Centre (ITTDC). The Centre is providing hundreds of places on IT Assistant Training Courses for secondary 3, and 5 school-leavers and mature unemployed persons. These courses, resulting from a Government initiative, are of 10 weeks duration. ITTDC also offers Professional IT Training Courses to graduates either on a two-month, full-time basis, or seven months part-time and new IT in-service IT Upgrade Courses. 110 of the latter currently are running.

In parallel, the VTC's Institute of Vocational Education (IVE) has over the past two years redesigned all its sub-degree courses, 72 of which are IT related and 45 have rich IT content. The VTC is greatly encouraged and supported by the Government in IT developments. For example, the Government has decided to invest HK $176 million in upgrading the VTC's IT infrastructure.

Finally, I would like to describe one other initiative we launched in recent years. This covers the important core generic skills requirements highlighted by the Secretary for Education and Manpower, namely, communication, numeracy and IT. The initiative is for new courses which not only address the three core skills, but also serve to provide motivation and an improvement in the ability of the participants to compete in the job market.

The initiative arose as a result of the awareness by the Government and the VTC some two years ago that the pool of unemployed secondary 5 school-leavers with mediocre educational achievements not only did not have a sufficient educational attainment to enter further education, but also did not have an education directly applicable to the world of work.

The new courses, offered as a one-year, full-time Foundation Diploma and a two-year, part-time Foundation Certificate, aim at bringing the students up to a five HKCEE pass equivalent, by way of a curriculum that focuses on remedial teaching in English, mathematics and the use of computers. This allows them to compete for further education, but also equips them with basic generic skills making them better fitted for the world of work. The VTC commenced the Foundation Diploma with 2 000 places and 760 Foundation Certificate places in September 1999. The Government recently announced funding for a further 1 000 full-time places for September this year.

We believe we have done a reasonably good job over the past three years. There remains, however, a good number of future challenges and there is no room for complacency. But we do know that we are moving forward in the right direction.

It remains for me to join the Secretary of Education and Manpower in wishing all of you here today a rewarding and stimulating conference.

Thank you.

REFORM AND DEVELOPMENT
OF TERTIARY VOCATIONAL EDUCATION IN CHINA

Professor Binglin ZHONG
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Abstract: This essay introduces the general situation of Tertiary Vocational Education in China, and demonstrates its motivations and main characteristics and experiences of training. Moreover, it gives some information about relevant policies and measures implemented by Chinese Government and the developing blueprint for the next period.

1. CURRENT SITUATION OF TERTIARY VOCATIONAL EDUCATION IN CHINA

Since 1980s, in order to adapt to the needs of modernization construction with Chinese characteristics, a lot of colleges, namely advanced specialized institutions, short-cycle vocational colleges and adult higher educational institutions, actively participate in the reform of educational provision. They have adjusted their training objective, attached more importance to cultivating the practice-oriented talents oriented to the frontline of manufacture, construction, administration and service etc. Up to now, they have made considerable progress and got some good experience. Since 1990s, China has paid more attention to the development of tertiary vocational education, clarified its training target, meanwhile, a number of new tertiary vocational colleges have been founded. Although, these types of colleges as mentioned before have different name and own characteristics, their main objective is to produce skilled professionals. According to statistics of 1999, the scale of tertiary vocational education in China is as follows:

- There are 1345 independently-running tertiary vocational colleges across China, taking up 69.26% of the total of higher educational institutions, among which 313 are advanced specialized institutions, 161 short-cycle vocational colleges and 871 higher educational institutions for adults. Besides, there are 982 Adult Educational Colleges attached to the regular universities and 37 colleges run by social forces.
- The total enrollment is 3,980,600, accounting for 55.37% of the whole higher educational institutions, among whom 1,127,300 are in advanced specialized institutions, 234,200 in short-cycle vocational colleges and 2,619,100 in higher educational institutions for adults.
- College graduates number 1,189,000, covering 68.50% of the total graduates from higher educational institutions among whom, graduates from advanced specialized institutions reach 365,300, short-cycle vocational colleges 41,400 and adult higher educational institutions 782,300.
- The number of new entrants in college adds up to 1,476,900, making up 53.62% of the total recruit of undergraduates in regular universities and colleges, in which advanced specialized institutions and short-cycle vocational colleges newly admitted 478,400 students, higher educational institutions for adults 998,500.

2. FOUR MOTIVATIONS TO DEVELOP TERTIARY VOCATIONAL EDUCATION IN CHINA

1. With the rapid increase of social demands for various advanced skilled talents, measures must be taken to adjust educational category and structure. It is in such a situation that tertiary vocational education came into being.

Social talents seem to be grouped as follows: academic talents; engineering talents; technical talents and skilled talents. Academic talents conduct research on natural and social laws, engineering talents engage in design, decision-making and work planning. Only the advanced skilled professionals, namely the technical talents and skilled talents, are those who appear on production or working frontlines and convert engineering designs, decisions and layouts into material things (such as products or projects etc.), bringing direct benefits to the society.

It has been proved that laborers' low quality and lack of scientific creativity, as a major factor, has restricted China's economic growth and international competitiveness. Not only do we need to cultivate a great number of talents who can conduct scientific research or project design but also we need numerous advanced skilled talents working on production forefront or being engaged in construction, manufacturing works etc. It is for this reason that tertiary vocational education has mushroomed and will play an important part in rational adjustment of higher education structure.

2. With the rapid development of economy and great advance in science and technology, the role of advanced skilled professionals becomes increasingly important. Therefore, tertiary vocational education is urgently needed.

After the Second World War, especially since the 1960s, great advance in science & technology and the rapid economic growth have brought about overall changes in employment posts. The wide application of advanced technology resulted in the appearance of many new professional posts, such as robot technician, data processing and system analyst etc. The flourishing of the third industry featured by service brought about another series of new job posts, for instance, advertisement editors, advertisement promoting supervisor, enterprise assessor, security consultants, investment analysts and so on. The previous posts have been either differentiated or compounded. Take the nurse post for example, with the development of medical and nursing technology, nursing become more and more specialized. There have been spiritual nurse and surgical nurse etc.

Whether the new job posts resulted from technology development or from the third industry, they both require advanced technology and high intelligence, which goes far beyond the training target of Secondary Vocational Education. Differentiation of professional posts in technological level demonstrates two factors: on one hand, more kinds of technology are requested on one post; on the other hand, technological level is increasing. Thus it can be seen that with the changes in social technical posts, technical education must be upgraded to higher level, then professional education, which is tertiary vocational education in China, should aim to train advanced skilled professionals.

3. To develop tertiary vocational education is an important way to improve the whole nation's scientific and cultural quality.

China is a large and populous country. It's hard to make more young people receive higher education by merely depending on regular universities. Meanwhile, with the improvement of living standards, people are more eager for higher education nowadays. So only through vigorously developing tertiary vocational education can make it possible for more people to receive higher education. This is an important access to improve the whole nation's scientific and cultural quality.

4. According to the trend of world educational reform, tertiary vocational education should be developed.

Since the 1960s, various kind of tertiary vocational colleges have mushroomed throughout the world. There are community colleges in North America, polytechnics attached to universities and multi-subject technical colleges in the U.S., Fachschule and Dual-System vocational colleges in Germany, polytechnics in Australia, short-term technical colleges in France; short-term universities and technological scientific institutes in Japan, junior vocational universities in South Korea and so on. These colleges all cultivate advanced skilled talents, with two-or-three schooling years. With the worldwide tertiary vocational education flourishing, China will drawing on good foreign experience and methods, at the same time, actively explore the best way to produce advanced skilled professionals in accordance with the reality of China.

3. FUNDAMENTAL CHARACTERISTICS OF TRAINING PROGRAM OF TERTIARY VOCATIONAL EDUCATION IN CHINA

The six fundamental characteristics of training program in tertiary vocational education are as follows:

- The essential task is to cultivate advanced skilled talents who are specialized in advanced technology application and are competent for production, construction, management and service forefront.
- The objective is to meet the requirements of society. Take technology application ability as the training target, design the frame of students' knowledge, ability, quality structure and training program. Graduates should possess such qualities as wide range of knowledge, appropriate basic theory and strong technology application ability.
- The system of curriculum and teaching content should be constructed with application ability as the key factor.
- Practical Teaching and skill training, as a main method to train students' technology application ability, should take up a comparatively large part in teaching content.
- Development of faculty with Two Qualifications (one is for academic, such as professor, assistant professor etc; the other is for practical work, for example, qualification of engineer or accountant etc.) is essential to the improvement of teaching quality.
- The fundamental way to train advanced skilled talents is to carry out co-operations between colleges and the industrial world, between teachers/students and practical laborers, moreover, to combine theory with practice.

4. POLICIES AND MEASURES FOR DEVELOPING TERTIARY VOCATIONAL EDUCATION IN CHINA

- **Administrative system**

According to the *Law of Higher Education of the People's Republic of China* and the relevant documents of State Council, tertiary vocational education are mainly administrated by provincial level governments. Under the guidance of the state's macro-policy, governments at provincial level take their own condition into consideration, which consists the local economy demands, enrollment capacity and graduating students' employment. Then they determine annual enrolment plan, enrollment methods, curriculum programming, charging criterion as well as registered residence management. They are responsible for distributing certificates of academic diplomas, giving advice on employment to graduating students and determining the averaged allowance criterion for each student. Meanwhile, they bear the responsibilities for educational quality, working out regulations for educational provision and improving school facilities etc.

The Ministry of Education of the state is mainly in charge of overall planning, macro-control, synthetically coordinating relations among various branches, formulating basic and unified quality criterion and administrative methods, working out annual directing plans and exercise supervisions and inspects.

- **Tertiary vocational education provision**

Tertiary vocational education has multi-forms provisions. At present, institutions in which tertiary vocational education is conducted are: short-term vocational universities, vocational and technical colleges, advanced specialized institutions, independent higher educational institutions for adults, tertiary vocational education units attached to some regular universities (subordinate college) and private colleges or universities run by social factors etc. The main forms of running a school are full-time, part-time, teaching through correspondence, broadcasting or television etc.

- **Program setting**

Programs of tertiary vocational education are set up and adjusted according to the needs of local economy and social development, and all the specialties are determined by colleges themselves and then reported to the local educational administrative departments for the record. The scope of specialties can be wide or narrow. At present, the Ministry of Education is starting to draw up *A Guide to Setting up Specialties of Tertiary vocational, which* offers tertiary vocational colleges a reference.

- **Period of schooling**

The general schooling of tertiary vocational education ranges from 2 years to 3 years in length. Generally speaking, the specialties concerning management require 2 years and the specialties of technology 3 years. The period of schooling of part-time students is appropriately prolonged. Students graduating from junior middle school require 5 years to complete their study.

5. THE BLUEPRINT FOR REFORM AND DEVELOPMENT OF CHINA'S TERTIARY VOCATIONAL EDUCATION

1. Improving the patterns, contents and methods of training talents.

Formulating and implementing *The Plan of Construction and Reform on Patterns of Training Talents and Teaching Contents of Tertiary Vocational Education oriented to 21st Century*. Trying to find, within 5 years, some exemplary and influential patterns of training with virtual breakthroughs in tertiary vocational education. And trying to bring out a number of optimized teaching programs and produce a number of printed or audio-visual teaching materials and relative software which are all creative in both content and form.

2. Speeding up compiling of textbooks for tertiary vocational education.

Compiling 500 kinds of textbooks with outstanding tertiary vocational characteristics in 5 years or so, and we will take two steps to finish the task. The first step is to encourage compiling this kind of textbooks on the basis of previous ones, which will last for 2 or 3 years. The second step is to produce a large number of excellent textbooks with tertiary vocational characteristics of our country then form a complete set of optimized textbook system in another 2 or 3 years.

3. Speeding up training teachers with double qualifications.

We'll choose a number of tertiary vocational colleges with good conditions, excellent teaching quality and distinctive tertiary vocational characteristics, setting up 30 teachers training bases of tertiary vocational education. And within 5 years, all the middle-aged and young teachers will take their turns to receive training of vocational education theory and technical skills so that we can qualify them for new teaching tasks. Based on certain academic level and teaching level, directing them to get double qualifications. The objective is to make 80 percent of professional teachers to obtain two qualifications. Meanwhile, China will take an active action to co-operate with foreign technical colleges in the field of teachers' training.

4. Speeding up construction of practical training bases

In order to meet the needs of the new teaching system, it is necessary to set up 100 high-level local practical training bases of tertiary vocational education with good experimental and practical conditions, which enable students to receive more effective training on practical skills. The above-mentioned bases should play an exemplary role and be open to other tertiary vocational colleges in the said area.

5. Perfecting the evaluating system of tertiary vocational education.

China will set up teaching evaluation system in accordance with tertiary vocational education laws and characteristics. The Ministry of Education has established *working committee on human resource development through tertiary vocational education* and will set up as soon as possible the Steering Committees of Basic Courses and the Steering Committees of Specialties Teaching. The later is mainly composed of experts in the fields of economy and enterprises and professors in colleges.

6. Accelerating the reform and construction of professional programs in tertiary vocational education.

Creating 300 professional programs as models. By comprehensive improvement in professional programming, training target, curriculum, educational methodology, faculty development and practicing bases, China try to enable the specialties to actively meet the needs of social economy and development, focusing on advanced skilled talents training. Within 5 years or so, setting up 30 model tertiary vocational colleges.

7. Attaching great importance to the researches on teaching theories of tertiary vocational education.

The results will be used to direct teaching reform, and gradually to form a complete set of theories on tertiary vocational education suits to China.

MANAGING CHANGES IN THE INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS (IT&T) INDUSTRY – THE CHANLLENGE FOR AUSTRALIAN VOCATIONAL EDUCATION AND TRAINING (VET) LEADERS

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Abstract: Within the Australian context of industry and educational reform Heather will identify the 6 most pertinent changes to the Information Technology and Telecommunications sector and indicate how these changes will impact on vocational education and training providers.

She will address how leaders of education reform can harness the opportunities presented and prepare themselves to lead staff and students to a more responsive environment, that will meet the demands placed upon it.

In her presentation at the conference she will highlight some examples of Australian Best Practice against a change model that is relevant to the IT&T sector.

> **In a digital and knowledge economy, competitiveness rests on the skills of people**
>
> *IT&T Industry Task Force*

The Australian VET context has changed significantly over the last 10 to 15 years to foster local and international competitiveness, provide more flexible learning options for students, to develop a national framework which ensures portability of qualifications and recognises the existing knowledge and skills held by the Australian workforce.

The change experienced by Australian educators is indeed a familiar trend world wide. This combined with substantial industry restructure and reforms in workplace practices has ensured that no educational disciplines have remained unchanged.

Of all the educational/industry reforms the IT&T sector has argumentatively been one of the most affected.

Their change includes:

1. The emerging knowledge economy and the rapid spread of, and need for technology not only in educational sectors, but new consumers, business and industry. In today's "knowledge economy" suppliers and consumers continuously exchange information about the development and delivery of products and services. Increasingly, this frenzy of information exchange takes place between people at vast/global distances from each other. Where once educational institutions held all the knowledge it is our reality that increase of personal and business/industry web pages has meant many other providers can sell new knowledge through education and training, and more Australians are turning every day to e-commerce solutions for skills development.

The www is just one step in a progression of steps. According to [1]Peter Moore we have only progressed about 10% down the ultimate path. There is a lot of potential out there, the market is by no way saturated. We are really right at the very start of business opportunities associated with a monumental roll out – the "herd" effect is about to take off.

Currently only 25% of homes are connected to the www, less than 10% of businesses order on the internet, and only 20% of companies are involved in internet sales. Very few areas of business in the economy are using e-commerce, it is only really some areas of retail, groceries, banking and education. The National Office of the Information Economics (NOIE) has major initiatives in health and education.

If we are only 10% now and our business is already affected, where will we be in 5 years' time when half the globe is internet enabled?

2. Increase in job opportunities

There is both a worldwide shortage of skilled IT professionals and a rapid increase in demand for jobs. According to the [2]IT&T Industry Skills Task Force it is estimated that there are currently around 360,000 people primarily engaged in IT&T activity in Australia. IT&T employees account for 4.2% of the total Australian workforce. It is hard to estimate what the employment figures are in the IT related jobs, or jobs where IT is a critical requirement. The future growth in demand for IT&T skilled people over the next five years is expected to be:

In 1 Year	In 3 Years	In 5 Years
+ 29,700	+ 87,700	+ 169,500

Of all IT&T employees, the current top three IT&T activities in which employees are mostly engaged are:

- Communications technicians – (25%);
- Applications development and programming - (14%); and
- Call centres – (8%).

The Top three IT&T activities in which organisations are mostly engaged are:

- Applications development and programming - (72%);
- Network management/support/integration - (59%); and
- Applications implementation - (54%).

The three fastest growing areas of activity over the next five years will be:

- Internet services and support – 174% growth;
- Multi-media content development – 164% growth; and
- Services consulting – 126% growth

The areas of current work in strongest current demand are:

Client/server applications, Internet and multi-media, Database management systems, System software and support, Process/systems management/consulting, Office/E-mail/Groupware, Networking, LAN administration

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[1] Peter Moore
E-commerce and the New Economy, Australia National Office of the Information Economics (NOIE) 2000.
[2] http://www.aiia.com.au/education/skillstaskforce.execsummar.html

Positions where the most intense demand pressures are expected over the next five years are:

	Percentage who expect positions will be very difficult to fill
Systems architects	64%
IT Strategists	54%
Database Administrators	39%
Services Consultants	37%
Business Analysts	35%

[3]Dr. Kemp, our Federal Minister for Education, indicated that the IT industry is making a major contribution to Australia's productivity. It is one of the major contributors to low inflation and that there is a strong potential for IT training in Australia to meet the present job requirements. He went on to say that Technology turnaround is now 3-6 months, and the education sector must produce skills in shorter timeframes than at present. To do so we need to remain ahead , we need to have a more flexible education sector to meet the demands of the IT industry sector. He challenged VET providers that there is a need in the education sector for reform to respond not only to IT but all other enterprises.

3. The pace of change often comes down to the survival of the fastest. Those into the market first, whether in education, e-commerce, or e-learning, etc., have most to gain.

[4]Geoff Scott in his paper ***Change and Educational Leadership*** agreed that if colleges and universities don't respond appropriately, their very existence, at least, in its present form is under threat.

We may ask, "Who's to blame for the shortage of trained staff – government, industry or the education sector?"

Well, no one is to blame. The technology has just moved so quickly that it has taken everybody by surprise. For example, colour TV took 35 years to achieve the same level of uptake that the Internet achieved in just 4 years – the length of time of a typical undergraduate course. IT&T products are now often redundant after just 12 months.

Industry will have to become more strategic in its approach to training and Human Resources generally, education and training providers will have to find better ways of monitoring and serving industry demand and government will have to help provide a flexible and responsive business environment and education and training policy framework.

4. The need to colonise and mobilise growth in this area will only be achieved through strategic partnerships, alliances, relationships and attachments with all educational sectors, industries and businesses.

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[3] Dr. Kemp, Federal Minister for Education, Australia.
Opening address at Networking 1999 Seminar on 3 September.
[4] Geoff Scott, University of Technology, Sydney.
Change and Educational Leadership 2000

Peter Moore indicated that individual organisations, no matter how large, cannot survive by themselves in the New Environment as evidenced by Telstra and News Corp.

5. The need to be risk-takers and managers of risk

There is a need for careful, quick and creative decision making centred on student and industry needs.

[5]Barry Hobart, Chief Consultant to UNESCO UNEVOC Centre in Berlin, noted that VET teachers and trainers have the most crucial role and responsibility to assist in this development. They must undertake programs of initial and recurring professional development and need to be involved in continual upskilling and updating on changes and new requirements of the workplace so that they can continue to adapt to the rapid change, be relevant and be ready to embrace change.

6. Pressure from competitors for a percentage of VET training markets. IT now increases that pressure as universities and VET providers from interstate and overseas promote and market to what was traditionally our markets. This gets impacted to a greater degree in country and remote areas of Australia where they are vulnerable. The pressure on the VET sector only mirrors the increased pressure placed on the industry because of the global growth of the industry as a whole. All industries are using IT to leverage competitive advantage.

OUR ROLE AS EDUCATION LEADERS

> **"When the winds of change blow; some build walls, others windmills"**
>
> ***Dr. Qian tang***

If we as managers and educational leaders don't embrace the opportunities that these changes bring to rejuvenate our colleges, teaching and learning strategies, then we will eventually truly be outdated, irrelevant and the industry/business we serve will be disillusioned about the value of accredited national training. To be eventually judged as a bureaucratic, bungling, irrelevant provider of education and training will lead to our, and my, eventual demise.

So what do I need to do to suitably meet the challenges and ensure a bright future? I list some of the most important factors, in reality there are more. They are:

1. Look for and promote cross sectoral, cross industry partnerships.

[6]Thorn indicated that the best practice principles for conducting partnerships with industry were:

- Understanding the business and the relationship between training and profitability of the enterprise;
- Being available;
- Sharing knowledge and expertise;

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[5] Barry Hobart, Chief Consultant to UNESCO UNEVOC Centre, Berlin
Training Review October/November/December 1999 – "Going Global" Pages 12-13

[6] Mr F. Thorn, *ANTA National Conference* ***"Spotlight on the Provider".***

- Managing the relationship;
- Collaborating with competitors with a view to the best outcome for the client.

There is an increasing focus on learning and consequentially teaching. This learning may occur on job and off job and may be government funded, employer funded or self funded

2. Learn to walk the talk

The new technology and its application in VET calls for innovative and creative talk, where ideas can be exchanged and are expected.

Professional associations such as IVETA and AUSTAFE have an important role to play.

You need to get involved in such things as:

- innovative systems;
- R&D;
- emerging industries; and
- new technology development.

It is important to talk to people who are walking the talk.

3. Plan for Web-based interactive education offering and plan for the technology to support

Often barriers are expressed as the existing technology infrastructure, time to develop programs etc. College and Institute-based planning can assist.

4. Take time to look at the future

[7]Daniel Burns in his book ***Future View*** suggests that we can be too bogged down with day-to-day work and not become a futurist by knowing the tools that exist and creating applications that suit. He suggests we ask ourselves some hard questions eg.

Are we learning as fast as our students? No? Then get a technology mentor.

Is change happening from outside (crisis management) or inside (controlled plan management)? Outside? Then take time to plan.

In order to speed up are you prepared to slow down? Think strategic!

Are we looking backwards, concentrating on the now, or are we travelling forward? Perform a time travel audit. It's all in the mind.

5. Manage change well by:

5a. Concentrate more explicitly on the how of change not just the what

Introduce staff involved in core developments in TAFE (like a move to flexible or online learning) to change frameworks early on. This helps staff with change because they will be clearer on how it works, why some steps are important and where these fit into the bigger picture of effective change management. As a result they will feel less anxious because they will not feel they are mixed up in processes and forces which they don't understand. Labelling what is likely to happen before it actually does reduces anxiety and feelings of personal inadequacy.

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[7] Daniel Burns, Author, "***Future View***"

5b. Look to alternative models for achieving success

Look outside the box. Developing and rearranging specialisation with our competitors is a good place to start.

5c. Support, reward and recognise staff initiative

Remember that the best initiatives don't always come from those at the top. Remember to celebrate best practice.

Some web pages of interest are:

- LIVENET
  http://livenet-demo.it.uts.edu.au:8080
- Australian Technology Park (ATP)
  www.tafensw.edu.au/ipc
- Lidcombe College of TAFE
  http://www.ssi.tafensw.edu.au/colleges/lidcombe/lidcomb.htm
- Curriculum Corporation
  http://www.curriculum.edu.au/vetis

6. Always question in whose interest are the changes being made

This is our moral and best practice managers' obligations. For example, is it in the best interest of students, business promoters, the economy?

IN CONCLUSION

> **IT&T industries need to farm instead of fish for its staff.**
>
> ***Karen Whittingham***

There is no doubt that educational managers have to respond to the changes as previously mentioned.

In this paper I have tried to outline what I feel are the challenges and the opportunities within this context of change. I hope that my paper acts as a kind of wake up call for all to get up and get going with implementing/undertaking what you need to do.

This may mean for:-

Education and Training Providers where there is a current trend to maintain what is currently in place but apply new technologies to delivery - that they have to challenge this thinking. Do they need to focus on new gradual change, or radical improvement?

There is already a need to move to a new paradigm for a new type of customer, which involves new delivery of skills and knowledge to these new clients.

Vocational Leaders that as we, managers and educational leaders, standing at the edge of a new millennium with the potential to revitalise learning that we have responded appropriately in well thought out and coordinated ways.

Industries that where they intend to recruit for skills alone, they will have to think about strategic alliances with educational institutions and investing in training.

Professional Associations such as AUSTAFE and IVETA, we need to encourage the critical debate, research and healthy discussions that occasions like this conference, afford.

Together we can indeed build a healthy future that is more than capable of meeting future IT&T needs.

GLOBAL IMPLICATIONS OF EDUCATION'S POTENTIAL FOR STIMULATING ECONOMIC DEVELOPMENT

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Index: Education and economic development, human capital, education and earnings, economic returns to vocational education

Abstract: An examination of past and future contributions of education to economic growth and development with an emphasis on the unique role that can be played by vocational education.

1. INTRODUCTION

Education has proven itself to be a powerful engine for economic growth and development. At the same time, lessons have been learned and there is a growing realization that simple expansions of the education sector are not sufficient to guarantee desirable economic and social outcomes. In this paper, I have two purposes. First, I provide an overview of how economists think about relationships between education and economic growth along with a sketch of the basic empirical findings. Second, I develop the thesis that as powerful as education has been as a source of economic growth during the post World War II period, it has the potential to be even more powerful in the future. I will argue that the realization of this potential presupposes an ability to deal more directly with the quality in contrast to the quantity of education, and it is in this context that I consider the future and potential contributions of vocational and workforce education. I have been impressed with the potential for vocational and workforce education to contribute to the economic wellbeing of individuals as well as nations, and I deal explicitly with the steps that need to be taken to more fully realize this potential for the future.

2. BACKGROUND

Conceptual Underpinnings

It has been widely observed and indisputably demonstrated that positive correlations exist between levels of education attainment and conventional measures of economic activity. In particular, substantial proportions of differences among and within countries in average labor productivity, poverty alleviation, economic growth, and social mobility have been linked to differences in education attainment. These relationships have been shown empirically using output accounting exercises (see Knight and Sabot, 1987 and Krueger, 1968); micro wage function estimates (see Behrman, 1990; King and Hill, 1993; Psacharopoulos, 1994 and King and Hill, 1993); and cross-country regressions (see Barro, 1991; Barro and Lee, 1993 and Birdsall and Sabot, 1994).

More in dispute are the various conceptual views that have been offered about "why" these relationships exist. The following three alternative, although not altogether inconsistent, points of view have emerged in the literature.

Human capital theory. According to the human capital point of view, positive relationships exist between education attainment and economic indicators like earnings because education enhances capabilities which subsequently command returns in labor markets. The crux of the matter is that students learn things in educational institutions like schools that are economically valuable. The inter-temporal nature of the relationship is consistent with the idea of capital and investments. Costs are incurred early (both in terms of the time that is required to go to school by the students and in terms of the out-of-pocket costs that are incurred to provide the teachers, facilities, supplies, and other components of a school), and streams of benefits are realized later. These benefits can accrue to individuals in the form of enhanced earnings; they can also accrue more broadly to the society and give rise to economic growth for the society as a whole. In its most complete version, human capital theorists hold that students and/or their surrogates (e.g., parents or guardians) make decisions about how much and what type of schooling to acquire in part because of anticipated returns relative to costs. Theodore Shultz and Gary Becker are most prominently associated with the human capital school of thought and conducted their pioneering work at the University of Chicago, beginning in the 1960's (Becker, 1964 and Schultz, 1961).

Screening theory. Proponents of screening theory hold that these widely observed relationships are due not so much to a productivity enhancing function of schooling as they are due to the tendency for schools to reveal the existence of valuable but pre-existing traits embodied within their clients. According to an extreme version of this view, schools do nothing to enhance capabilities. Instead, they signal to prospective employers that those who graduate have certain capabilities and traits that were acquired either prior to coming to school or in some fashion that is peripheral to the schooling experience. Those who challenge screening theory ask questions like why it is that employers rely on schools to signal these capabilities rather than rely upon assessment devices that would presumably be less expensive and time consuming. Proponents of screening theory are quick to point out that because schooling is typically so heavily subsidized, firms do not bear the costs of schooling directly and that it may actually be more cost effective for them to rely upon schools to do the screening. See Grubb (1993); Katz and Ziderman (1980); and Rumberger(1987) for additional information about screening theory and efforts to estimate the magnitude of its significance.

Marxist theory. The education-earnings relationship can also be explained from more of a Marxist perspective (Bowles and Gintis, 1975). Here the idea is that schooling serves a social reproduction function that has several parts. On the one hand, schooling serves to legitimize economic inequality in the sense that it provides an answer to questions about why some individuals are more privileged economically relative to others. According to this view, what really explains economic success is the individual's family's social and class standing in the previous generation. Those who are privileged ensure that their heirs are aslo privileged and schools become devices to justify the differences that emerge.

On the other hand, schooling is also viewed as a mechanism that can be used to teach proper and class-specific behavior. Thus, the school also takes on a human capital function that is more than rhetorical. For students coming from working class background, the idea is that the school conveys skills and more importantly worker attitudes that keep the workforce docile and willing to work to the advantage of the more privileged groups in society. An important lesson for the less privileged members of society to learn, according to this view, is that their low placement in the economic order is largely due to their own inability to succeed in schooling. The Marxist view expects to see a highly differentiated schooling system with admission standards that serve to exclude "inappropriate" students from the elite schools. Denials of admission from the elite schools need to be viewed as creditable, and the "work hard without complaint" lessons being taught by the lower level schools need to be taken to heart. According to this view, schools become complicit in reproducing the existing social order, an ironic result given the widespread rhetoric suggesting otherwise.

All three of the frameworks are attentive to the magnitude and nature of income inequality in nations, and one of the lessons being learned is that educational systems in many developing countries act to increase rather than decrease income inequalities (Alesina and Perotti, 1994; Bhagwati, 1973; Fields, 1997; and Jimenez, 1994). This effect can be understood as a byproduct of the positive correlation between the level of education and lifetime earnings and the limited access to secondary and higher educational opportunities for the poor due to financial or other reasons. Moreover, this inegalitarian outcome is reinforced by two economic factors. First, the private costs of primary education are higher for poor students because of higher opportunity costs due to availability of wages from child labor. Second, the expected benefits are generally lower for poor students. Together, these two factors lower the rate of return to education for poor families compared to other families.

Toward synthesis. Economists and others have been debating the relative merits of these alternative schools of thought for a number of years. It is difficult if not impossible to resolve the matter empirically given the absence of experimental data (Ashenfelter, 1991), and perhaps the most sensible conclusion to draw is that each approach enjoys some plausibility and captures elements of the complexity surrounding the connection between something as finely textured as "education" and the complexity of something we can refer to broadly as "economic outcomes." As our ability to differentiate between different qualities and types of education becomes better developed along with a parallel increased capacity to conceptualize and measure economic phenomena of interest, there is reason to be optimistic about gaining a better sense over time into the precise ways in which education contributes to the economic lives of people and nations.

Empirical Findings

George Psacharopoulos (1994) has provided periodic overviews of the vast empirical literature that examines links between education attainment and economic outcomes. Among Psacharopoulos's findings are the following: (1) Social and private rates of return for all levels of education tend to be inversely related to a country's per capita income; (2) Rates of return to education have been declining over time with the significant exception of higher education where increases are being observed; (3) Rates of return tend to be highest for primary education and lowest for higher education; (4) Returns to education tend to be higher for women compared to men; and (5) Returns to vocational education tend to be lower than returns to academic/general secondary education. These findings have had a powerful influence on policy making around the world. In particular, they have prompted large efforts to expand educational opportunities in developing countries. The findings have also prompted policy makers to place special emphasis on primary education, education for women, and academic rather than vocational education.

Results of these efforts can now be seen in various trend lines that are compiled by the World Bank and other agencies. For example, it is clear that the enrollment percentages of various school-age cohorts have been increasing for most, but not all, parts of the world. In particular, progress toward increasing the percentage of 6-11 year olds enrolled in schools has been particularly difficult to achieve in Africa (World Bank, 1999).

3. IMPLICATIONS FOR VOCATIONAL EDUCATION

The implications for vocational education are particularly significant. Economists, particularly those coming out of a neoclassical tradition, have tended to be critical of conventional vocational education. Part of the hostility stems from these economists' attachment to human capital theory coupled with the respect neoclassical economists tend to harbor for free markets. These economists are wary of humankind's ability to plan something as complex as a modern industrial economy, and vocational education, at least in its traditional form, tends to fit with pro-planning kinds of thinking. An important traditional goal for vocational education has been to anticipate labor market needs and to sequence highly focused educational activities so that appropriate numbers of students with the appropriate kinds of skills are ready to enter labor markets in ways that bring supply into balance with demand.

Neoclassical economists tend to be skeptical of this kind of thinking. The alternative view is to place emphasis on types of education that are more broadly instrumental with the hope of promoting versatility and resiliency in students so that they can move from job to job in highly dynamic and difficult to predict labor markets. According to this way of thinking, the student who is more generally prepared and who acquires broadly applicable problem solving skills like basic literacy and numeracy is going to be the best positioned to thrive economically throughout his or her life. This kind of thinking has inclined human capital economists to see academic forms of education (where the presumption is that academic education is more broadly instrumental than traditional vocational education) as the better economic hope of developing nations.

The empirical literature regarding the economic returns to vocational education is instructive. In keeping with the human capital theorists' predilections, much of the research suggests that students receiving vocational education enjoy more modest returns to their education than do students who receive more academically oriented education. In the rate of return calculation both costs and streams of benefits are considered. Traditional vocational education has suffered on both counts, since it tends to be more costly than academic education and since the evidence suggests that the returns have been more modest. There are several possible explanations for why the returns have been modest: (1) the quality of the education may be low; (2) the quality of the education may be fine, but the match between the skills acquired and the nature of the job taken may be poor; and (3) the learning capabilities of the students involved may be problematic.

The last point about the capabilities of the students in vocational education is particularly significant and raises a troublesome methodological question about how rate of return studies are conducted for the education sector. An important goal in a rate of return study is to isolate the "value-added" by the type of education being studied. If it is the case that "more able" students are attracted into one type of education compared to another, there is a danger that some of the returns associated with "greater ability" could be wrongly attributed to the type of education rather than to the type of student. Suffice it to say that some of the premium attached to academic education in the empirical literature could stem from a failure to control perfectly for differences in the students across these areas of the curriculum.

In this context, it is interesting there is some recent evidence suggesting that economic returns to vocational education are higher than commonly supposed. In particular, Mane (1999) used several national longitudinal data sets from the U.S. and found that vocational courses had significant positive effects on the early economic successes of non-college bound students. He used his findings to conclude that employers value occupation specific skills and are not inclined to rely on the schools to provide students solely with general skills. While Mane's results are significant, he is comparing students taking vocational courses with those who are "non-college-bound." Selection effect issues are relevant here, just as they are relevant in the comparisons between students in vocational and academic tracks. Mane's results also need to be contrasted with other modern studies where the results are more in line with the conventional findings (e.g., Horowitz and Schenzler, 1999).

4. RESPONSES FOR THE FUTURE

We have entered a very challenging period of time for education throughout the world. In the United States, interest has been growing very rapidly in education and policy makers are making decisions that are holding educators increasingly accountable for achieving historically high outcome standards. The phrase "standard driven reform" is becoming common place throughout the nation, and it is clear that business as usual is not going to be acceptable.

We are also entering a period world wide where the results of some past policies have to be reckoned with. In particular, the rapid expansion of primary education has now set the stage for dramatically increased demands for secondary and post secondary education. It is at these levels that curricular diversification and the attendant divisions between academic, vocational, and technical courses of study come into play. Important decisions need to be made over the next ten years about how the learning needs of the influx of new students will be met. The economy is also changing dramatically. If anything, it is becoming more difficult to anticipate what the precise labor market skills today's young people are going to need for tomorrow's labor markets.

In light of these challenges, several things need to be done. First and perhaps most important, we need to develop in our youth an appreciation for learning along with the self confidence that students need to become life long learners. Learners need to be engaged with what they are learning, and modern vocational education as a type of education that is quite good at building and strengthening this fundamentally important appreciation for learning.

Second, we need to work at making education more relevant and connected to the real world. There are ways to do this without sacrificing academic rigor and standards. There is a growing appreciation in the broad field of education for the significance of experiential learning, and the very clear reality is that this is something people in vocational education and workforce education have been practicing and perfecting for years. Lessons have been learned within the field of vocational education that colleagues in other areas of the field need to know more about.

In particular, we need to reject the false dichotomy that has been used to characterize academic or general education in contrast to vocational or technical education. Policy makers are particularly guilty of using this dichotomy as a wedge in the United States, and there are important lessons to learn from other nations about how to more seamlessly introduce elements of both kinds of curricula into a common course of study.

Third, we need to be attentive to the development of skills that are broadly instrumental regardless of whether we are talking about academic or vocational education. We know labor markets are very fluid and we need to provide students with the skills they will need to take the next steps in their careers. We need to develop versatile labor forces around the world where people can adapt quickly to changing conditions. Vocational education as a field needs to evolve further in this direction and can thereby benefit from some of the lessons that can be learned from human capital theory.

Fourth, and finally, we need remember that it is important to develop a sense of commitment and a pride of workmanship in all learners. We need to develop in our youth that inner voice that gets a person out of bed on a cold, gray morning when the great temptation is to roll over and ignore the alarm. And we need to find ways to stimulate genuine pride in the job that needs to be done. The work ethic is something vocational educators know something about and there are important lessons to learn for the entire field of education. And there are ways to instill this kind of pride without succumbing to what the Marxist critics would hold is the de-humanizing nature of education that is geared to foster loyalty and obedience on the part of workers.

If these are the things we need to do, how do they compare with what is currently happening within the schools and the economy? As I look at the field, I see mixed results. On the positive side, I see considerable progress at expanding opportunities in terms of types of schools and approaches to learning. On the not so positive side, I see increasing evidence of an economy that operates with very sharp divisions between people who have certain skills and those who lack these skills. There seem to be fewer stepping stones between the "haves" and the "have nots," and this is worrisome.

In addition, schools seem to be evolving in ways where there are fewer opportunities for second chances. As we rely more heavily on high stakes testing, a course or examination failure becomes more serious and significant. Budgetary pressures are limited our ability to provide options for those who fall short of the standards, and the result may be an unsettling widening of inequalities that may or may not be merit based.

I also worry that we are becoming more and more pre-occupied with narrow measures of what we want students to accomplish. New York State, for example, has been moving very aggressively toward increased graduations requirements (Monk and Hussain, and Miles, in press; Monk and Hussain, 2000). I contrast this with the results of a series of focus groups that were conducted with parents and taxpayers throughout New York State. These respondents were asked what they associate most with high quality education. Interestingly, these respondents did not list high test score results and low taxes as their highest priorities. In contrast, they placed the most emphasis on the degree to which the school provided a caring environment and was able to attend to the individual needs of students (Monk, Nusser and Roellke, 1998).

The progress that is being make within vocational and workforce education has important implications for meeting these challenges both within education as a field and the larger economy. It will be important over the next ten years to take advantage of the progress that has been made toward expanding educational opportunities as well as the lessons that have been learned about better blending and taking advantage of the many complementarities that exist between vocational and other forms of education.

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ICT-SUPPORTED DEVELOPMENT OF COMPETENT SKILLED WORKERS AND PROFESSIONALS

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Index: ICT-supported learning, globalisation, vocational education and training

Abstract: Information technology has profoundly reshaped the occupational structure as a whole as regards both occupational classifications and occupational profiles. On the global level, a disadvantage of the growth of information technology is the increasing imbalance between developed and developing countries. My presentation focuses on the function of and the preconditions for applying information technology in the context of education and training, on the application of information technology in the production and dissemination of knowledge and, as a case study, on how the Finnish educational system is preparing for the challenges posed by the information technology of the 21st century.

INTRODUCTION

An information or knowledge society is characterised by the unparalleled growth of information and the informatisation of society. Informatisation is inextricably linked with technological development. A synthesis of computers and telecommunications has given birth to a knowledge network linking schools, homes, workplaces, banks and shops on a national, continental and global level. The new technology has also affected the economy as a whole, the changes occurring both in occupational structures and in the content of work, and the new forms taken by information flows. Information technology has profoundly reshaped the occupational structure as a whole as regards both occupational classifications and occupational profiles. Many occupations have seen a rise in the use of information technology in the last few decades. In Finland for example, in 1984 information technology was used on the job by 17 per cent, in 1997 by 66 per cent of wage and salary earners. In addition, a great proportion of the working population consist of information workers. In Finland for example, not quite a third of the workforce was information workers in 1980, while in 1997 the figure was 44 per cent (Statistics Finland, 1997).

At the moment there are extensive programmes in most industrialised countries intended to boost the development and introduction of information technology and promote its application to the operations of society. The introduction and utilisation of information technology is seen as a central national-level strategy. Such countries as the United States, Finland, Japan, the UK, Germany, Canada, Sweden, Norway, Denmark, Singapore, France, Spain and South Korea have found common development targets, such as information technology at schools, health services, and promoting multimedia. Shared trends discernible in knowledge-society strategies adopted and action programmes launched in different countries include

- increasingly versatile and integrated networks;
- simpler architectures (web computers);
- commercialisation of the Internet;
- a need to regulate the market;
- increasing electronic commerce.

At the Lisbon European Council held in March 2000, the Heads of States and Governments acknowledged that the European Union is confronted with a quantum leap coming from globalisation and the new knowledge-driven economy and set the Union, among others, a strategic goal to develop *e*Learning (European Commission, 2000). *E*Learning seeks to mobilise the education and cultural communities, as well as the economic and social players in Europe, to speed up changes to move to a knowledge-based society. The European Union has undertaken extensive measures in the field of knowledge-society policies. This expansion is due to the inclusion of many emphases of R&D activities into knowledge-society policies. A plan drawn up in 1994 started with the most basic considerations such as deregulation and creating a market. Information technology was presented as a means of promoting economic growth and creating new jobs. The current programme stresses social questions, such as acceptance of the information or knowledge society in different population groups and the prevention of polarisation.

As for the OECD's (Organisation for Economic Co-operation and Development) activities related to the knowledge society, their focus is on reforming the relevant legislation and the public administration, on formulating political targets for a knowledge society, and on international co-operation. The OECD distinguishes four categories of information workers: producers, processors and distributors of knowledge, and people in support services.

The growth and wide distribution of information do not in themselves indicate the function and quality of knowledge. In public debates, the concept of the knowledge society has been joined by that of the learning society. The *White Paper on Education and Training* by the European Commission considers the construction of a learning society an indispensable precondition for making good use of the globalised economy, the development of the knowledge society and the growth of scientific knowledge, and for averting the risks that these processes give rise to. A factor that must also be taken into account on the global level is the increasing imbalance between developed and developing countries created and promoted by information technology.

My presentation focuses on three subjects: (1) applying information technology in learning an occupation, (2) applying information technology in the production and dissemination of knowledge on development of vocational education and training and, as a case study, (3) how the Finnish educational system is preparing for the challenges posed by the information technology of the 21st century.

ICT IN THE CONTEXT OF EDUCATION AND TRAINING

Researchers of pedagogy have discussed ways of restructuring the teaching and learning practices of school so as to make them more supportive of the development of the information-processing skills characteristic of experts or competent workers. These discussions emphasise the importance of ICT.

The new information and communications technology make it possible to develop cognitive practices of a kind that guide students towards the acquisition of the progressive problem-solving skills characteristic of a competent professional (eg the computer-supported intentional learning environment CSILE developed at the University of Toronto, WorkMates, developed at the Centre for Learning Research of the University of Turku, and Future Learning Environments, developed by the University of Art and Design Helsinki in collaboration with the Department of Psychology of the University of Helsinki) (Lehtinen, 1997). Cognitive practices developed through ICT support problem-centred studying that can be brought closer to various occupational practices (for example by applying the model of research-based learning). ICT can also foster studying aiming at learning and understanding. Learning is motivated particularly by technology that makes it possible to organise individualised work processes, varying task contexts and links with society's authentic occupational environments. Network-based action models and new technologies enable students to move, in a natural and relevant way, between school and the institutions of the surrounding society. This has meant the expansion of learning environments beyond the confines of school to occupational activities and contexts outside formal education.

ICT has expanded our learning environments. In order to ensure that ICT will support conscious and high-quality learning we need to analyse conceptions of learning as a starting point for network pedagogy. According to Erno Lehtinen (1997), network pedagogy is based largely on the central ideas of the last few years' research on learning. He characterises learning as the, among other things, constructive, structural, self-directed, goal-directed, situation-specific, and collaborative processing of knowledge. Learning should be seen as the active construction of knowledge and skills rather than as the passive reception and storing of information. Because the acquisition of knowledge and skills is an active process initiated and maintained by the learner, the information transmitted affects the course of learning only indirectly. Drawing on their previous knowledge, learners actively observe phenomena, process the new knowledge that they encounter and construct, as a result, new meanings and structures.

Learning does not necessarily involve an increase in knowledge elements in students' minds but, instead, a gradual transformation of cognitive structures. In the course of their learning history individuals develop rather abstract and general assumptions and beliefs about the nature of things. These in part unconscious framework theories guide and direct learning. This feature of learning is emphasised also when operating within networks. Knowledge is retrieved and interpreted on the basis of the learner's earlier knowledge and beliefs. Metacognition and self-directness are skills acquired through learning and practice. Metacognition is an ability to be aware of one's own cognitive processes and to guide and monitor ones' own intellectual performance. The more self-directed learning becomes, the more responsibility learners themselves take for their learning.

Goal direction in teaching and learning is probably a self-evident principle. What is not self-evident is how far and at which point the student should be allowed to themselves define learning targets. Information networks provide an open learning environment where students can, under their own direction, carry out research and studying processes to reach targets set by themselves. This prevents purposeless wandering in information jungles.

Situation-specific learning is linked with a particular social and cultural situation. In this context, learning is seen as changes in individuals' participation in the activities and practices characteristic of a given culture. Situation-specific learning calls into question institutional education and learning taking place in isolation from the situations where knowledge is applied in practice. Computers and information networks enrich school-based learning by making possible virtual participation in activities that would otherwise be beyond reach.

The role of social interaction in learning has been emphasised for a while. Different cultural traditions exert an important influence on the nature of the social interaction that emerges in learning environments and on how it affects learning. Collaborative learning implemented through information networks offers a range of flexible approaches to using various forms of communication. The rapid development and expansion of ICT have led to global networking and, as a result, to a new kind of communication culture in studying. The emerging communication cultures provide challenges to the future studies of network pedagogy.

As regards the development of teaching and learning practices, information technology is both a potential tool and a challenge. How can we exploit information technology to foster the growth of competent skilled workers and professionals and the development of their information-processing skills? Technology-based learning environments can promote (a) research-based learning and problem-solving, (b) the development of students' self-evaluation skills and other metacognitive skills, (c) the formation of motivation, (d) organisational learning and (e) closer ties between the culture of school and the culture of the workplace. As mentioned above, the learning society has recently emerged as a concept used alongside that of the knowledge society. Lifelong learning and, in this context, making use of information technology to support learning in all age groups, has become an increasingly important consideration. Pelgrum and Anderson (1999) coordinated the international study among twenty-six countries on the educational assessment of ICT infrastructure, goals and practices in the context of International Education Attainment (IEA) studies. Students at primary, lower secondary and upper secondary education levels experienced most satisfying of the learning activity involving computer-related technology concerning their information-processing, production and communication/collaboration activities.

Constructing networks and communities supporting lifelong learning with the aim of enabling local and global enterprises and communities and different work cultures to contribute to the learning projects of educational establishments may be considered a central strategy for developing the pedagogy of vocational education and training. Developing a knowledge and learning society to meet human and societal needs poses a challenge particularly as regards the creation and maintenance of learning networks using ICT.

A NATIONAL CASE OF PREPARING FOR ICT OF THE 21ST CENTURY

In a knowledge society, knowledge is an important resource. The development of the techniques of producing and transmitting knowledge exerts an essential influence on the structures and contents of and the working methods used in education and research. In Finland, knowledge-society policy has been implemented on the basis of two extensive strategy documents, *Koulutuksen ja tutkimuksen tietostrategia* (official English translation: *Education, Training and Research in the Information Society)* and *Kulttuurinen tietoyhteiskunta* (*A Cultural Information Society)*. In education and research the knowledge society is being implemented through the gradual digitalisation of the cultural capital that makes new information and communications technology possible and the provision of a more versatile and equal access to it.

The first knowledge strategy for education and research in Finland, covering the years 1996-1999, was formulated by the Ministry of Education in 1995. The current strategy was devised for the period 2000-2004. The Government's aim is to use information technology to promote employment and national competitiveness and to ensure that citizens have access to and can exploit knowledge and that they possesses the basic skills in using knowledge and information technology. The strategy also proposes measures to guarantee high-performance computing capacity with a view to supporting scientific research and improving the preconditions of producing and using network-based multimedia. The Ministry of Education (1999) defined its vision of developing a knowledge society as follows:

> By the year 2004 Finland will be one of the leading knowledge and interaction societies. Success will be based on citizens' equal opportunities to study and develop their own knowledge and extensively utilise information resources and educational services. A high-

quality, ethically and economically sustainable mode of operation in network-based teaching and research will have been established.

The overall theme of the strategy, the systematic development of learning environments based on research, can be divided into six subthemes:

- provision of information-society skills for all;
- the information-society skills of educational staff,
- the knowledge of professionals in the information and content industries;
- the consolidation of virtual learning environments;
- electronic publication, classification, and distribution of research information and teaching materials;
- strengthening the structures of the knowledge society.

The strategy draws guidelines for an information and knowledge policy for the 21st century by proposing 85 detailed strategic measures. The following measures stand out as central goals:

- Once-and-for-all education is replaced by continuous, lifelong education
- Everyone is ensured the acquisition of the basic skills needed in an information society
- Vocational education and training is guaranteed to deliver information-society skills that meet the requirements of a networking, constantly changing and increasingly global working life. The competencies of different knowledge workers are developed in the direction of the multi-disciplinarity presupposed by the changing contents of jobs.
- The preconditions and contents of teachers' pre- and in-service training are developed to meet the requirements of the emerging knowledge society.
- Support is given to the development of knowledge products and services.

In a knowledge society, the development of research activities is guaranteed among other things by seeing to it that the equipment needed for scientific computing is kept up to date. At the same time, encouragement is given to research on the political, social and cultural effects of a knowledge society.

The school system and the library network as a whole will be rapidly linked with the services provided by information networks. All educational establishments will be guaranteed a minimum level of services, while an education and research information network will be constructed as a part of a global open information network along the lines suggested by the present Internet and the standards of the emerging broadband networks and services.

Expanding use of information technology affects also culture profoundly. The report *A Cultural Information Society*, completed in 1996, outlines a developmental strategy for cultural policy in a an information or knowledge society by considering how the new technology influences the various areas of culture and what kind of trends can be discerned and anticipated in the near future. The strategy covers the following central considerations arising in an information society:

- provision of native contents;
- access to culture, regional policy and equality;
- new products and new services;
- international opportunities.

It also presents a number of theses as a basis for the cultural political measures proposed:

- Culture promotes the economy, employment and competitiveness.
- Culture promotes technology.
- Culture promotes democracy.
- Culture prevents exclusion.

The starting points of developments towards a knowledge society are often linked with the development of ICT, but quality of life should not be forgotten among its aims. The Finnish Ministry of Education (1999) emphasises a vision of an information society providing a high quality of life. In an endeavour to develop an information society characterised by a high quality of life, the following considerations are foregrounded:

> People's real needs must be made the starting points for developing an information society. There must be more high-quality pedagogic and cultural contents on information networks. Instead of the emphasis being on an information society as such, it must lie on a learning society and an understanding-oriented society. Information technology should serve as a tool helping to develop people's ability to criticise, select, use and apply knowledge and to process it further and turn it into new products.

ICT should be based on faith in the power of education. It must be used to look for means of promoting parents' and schools' ability to bring children and young people up as human beings who can make ethically valid choices and distinguish between right and wrong.

- An information society that violates privacy should not be allowed to emerge.
- Both the advantages and the social and psychological disadvantages of communication over telecommunications networks must be recognised. The emerging division into knowledge-rich and knowledge-poor areas should be prevented.
- New information and communications technology must be developed particularly with a view to guaranteeing various minority and special groups, such as the disabled or people living in outlying areas, a good life and equal participation.
- In teaching and training, new technology must be exploited to support learning that is individualised both in its forms and in its contents.
- In developing an information and learning society, support must be given, apart from the technological sciences, particularly to research on the information of knowledge society within the humanities and the social sciences.
- An information society is seen, from the perspectives of education, research and culture, as the richness of individual diversity and as an opportunity for individually defined quality of life.

The Information Strategy Group of the Ministry of Education monitored the implementation of the strategy in 1995-1999, and the Finnish National Fund for Research and Development (Sitra) was also commissioned by the Parliament to assess its implementation through a national evaluation of the educational use of ICTs (Huovinen, 1998; Lehtiö, 1998; Sinko & Lehtinen, 1999). Harnessing new technology to support education and learning has had a positive effect. However, universities and other educational institutions have used the new educational technology in quite heterogeneous ways. Likewise, there have been marked differences in the degree of commitment to the strategy. Only a fifth of the educational staff uses new technology extensively in their teaching. Almost all teachers and students would be willing to make more use of it in teaching and studying. The majority of the appropriations made for developing an information society were intended to finance the acquisition of equipment by and the building of information networks in schools, colleges, universities, libraries and archives. There were also appropriations for strengthening education, training and research related to the information or knowledge society by increasing the student intake and the number of teachers and researchers. Internationally, the measures undertaken in Finland to develop an information society represent a high standard. In a survey conducted in 55 countries in 1997, measured by social, communicative and information technology parameters Finland ranked second after the United States (Statistics Finland, 1997).

ICT IN THE PRODUCTION AND DISSEMINATION OF KNOWLEDGE

In recent years, the development of computer technology, diverse user applications and the experiences with collaborative research and development projects and networks have created a new situation characterised by decentralised and dispersed structures of knowledge logistics, electronic communication and virtual networking. The first step towards the new era involved the development of web pages and the correspondingly varied uses of electronic publication and communications media. Gradually, a number of new structures and environments have emerged to meet the needs of electronic communication and knowledge sharing among research communities that are developing collaborative research patterns. Alongside needs arising in the research communities, new providers have emerged to develop simple gateway services and user-friendly overviews of current research (see Manning & Lasonen, 1999; Manning, 2000). At the same time other new providers have emerged to develop electronic communications and knowledge sharing environments for European projects and networks (see Attwell, 2000; Brown & Attwell, 1999). Finally there is the emergence of project-related initiatives to develop telematic tools for the contextualisation and enrichment of interim research results and for the further processing of knowledge.

According to Kämäräinen (1999) CEDEFOP's (*European Centre for the Development of Vocational Training*) activities have been shaped in a number of evolutionary phases, and only some of them are directly related to a repositioning between European programmes, research communities and European projects. CEDEFOP launched a new interactive communication infrastructure, the Electronic Training Village (ETV) in 1998. At the same time, the ETV is related to the progress that CEDEFOP has made with independent research cooperation networks in the context of the joint development of telematic tools for knowledge sharing and electronic research communication. Success in this field has been essentially based on the participative accompaniment and synergy-promoting measures that have linked CEDEFOP with a number of major European projects and networks. Synergetic collaboration between ETV and related initiatives by independent networks led to a qualitatively new stage characterised by the preparation of a new framework to support research cooperation, knowledge sharing and knowledge utilisation, the CEDEFOP Research Arena (CEDRA). The central function of CEDRA is the production of instruments (overviews, research resource bases) for collaborative knowledge sharing in particular fields of research and development. These should not seen as a means of warehousing knowledge but as one of the interactive processing of knowledge. The related knowledge management, knowledge processing and knowledge transfer tools (metadata, mapping tools, visualisations of problem structures and relevance structures) should not merely illustrate the current stand of research-based knowledge. Instead, they should challenge producers and users of knowledge to discuss problem structures, relevance structures and principles of transformation in the context of knowledge utilisation.

On the basis of these trends it is possible to draw some tentative conclusions about the repositioning of CEDEFOP within European VET-related research and development cooperation:

- CEDEFOP can be considered both an actor in European VET research and a partner in promoting European research culture with supporting services.
- The support that CEDEFOP can provide to European VET research and related knowledge utilisation can be based on the development of infrastructures for knowledge processing and knowledge transfer.
- The development of such infrastructures does not involve merely technical applications of ICT but, rather, the collaborative participation of CEDEFOP in debates on contextualisation, enrichment and regeneration of research-based knowledge about VET.

INTELLECTUAL PROPERTY RIGHTS

The development of a knowledge society and information technology is a global process. The problems involved in digital environments are not problems of individual countries. Their solutions must be found through international harmonisation. Copyright has traditionally been an international branch of jurisdiction. Copyright and neighbouring rights are governed by several international conventions. Attempts to meet the needs to develop and harmonise copyright legislation that arise from information networks and digital technology have been made both on a global level and within the EU

The World Intellectual Property Organisation (WIPO) has for years worked for a reform of international copyright treaties. Its copyright treaty, concluded in Geneve in 1996, and performances and phonographs treaties set down the first international rules for copyright in the digital age and for using works on information networks. The WIPO treaties recognise the following rights:

> Copyright protection generally means that certain uses of the work are lawful only if they are done with the authorization of the owner of the copyright. The most typical are the following: the right to *copy or otherwise reproduce* any kind of work; the right to *distribute* copies to the public; the right to *rent* copies of at least certain categories of works (such as computer programs and audiovisual works); the right to make sound recordings of the performances of literary and musical works; the right to *perform in public*, particularly musical, dramatic or audiovisual works; the right to communicate to the public by cable or otherwise the performances of such works and, particularly, to *broadcast*, by radio, television or other wireless means, any kind of work; the right to *translate* literary works; the right to rent, particularly, audiovisual works, works embodied in phonograms and computer programs; the right to *adapt* any kind of work and particularly the right to *make audiovisual works* thereof (World Intellectual Property Organization, 2000).

Both agreements also include measures intended to protect digital materials and regulations concerning rights management information.

The European Union issued its directive about the legal protection of databases (96/9/EU) on 11 March 1996. The EU Commission issued on 20 November 1996 a communication to the European Parliament on developing and harmonising copyright in the context of encouraging electronic commerce (COM (96) 568 final). The communication is based on the Green Paper on copyright and neighbouring rights in the information society issued by the Commission on 19 July 1995. The communication presents the Commission's views on the future harmonisation needs and priorities in the field of copyright.

PROBLEMS OF ICT

To return to a more general consideration of the issues involved, in developing knowledge-society policies particular attention should be paid to the following considerations:

- preventing exclusion;
- recognising the teacher's changing professional role;
- preparing for the establishment and development of virtual schools;
- mastering the information overload;
- supporting evolution of indigenous cultures;
- guaranteeing the preconditions of acting as a critical citizen in a knowledge society;
- allowing for individual learning needs and styles as a starting point for education;
- teaching students versatile media readinesses on all levels of the educational system;
- preventing inequity between the industrialised and emergent countries; and
- considering gender inequity in using the resources of ICT.

There are a number of general ICT-related skills that are indispensable in a knowledge society. In the near future, the following skills will be foregrounded as basic media readinesses entailed by communications technology:

- using e-mail;
- using information search and retrieval systems;
- systematic distance education over information networks;
- assessing the reliability of knowledge;
- being able to use audiovisual methods and materials in one's occupation.

As their most general readinesses, people living in a knowledge society need communication skills, an ability to cope with change, an ability to learn, an ability to think ecologically, tolerance for diversity, and solidarity.

The civic skills possessed by the citizens of a knowledge society must meet the requirements of a networking, constantly changing and increasingly global life style but be based on independent initiative, self-directedness, understanding, and independent search for knowledge. Such civic skills include technical skills, communication skills and a network ethics, the skills needed in acquiring and using information, consumer skills, and influencing knowledge-society policies. On the global level the contents and relative priorities of these goals will vary. As it is, there is little balance in the way such goals are materialised. The rich industrial countries should assume some of the responsibility for preventing ICT from becoming one more factor creating inequality on earth.

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WHITHER VOCATIONAL EDUCATION?

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INTRODUCTION

Hong Kong is in the latter stages of a major review of its education system. The review's recommendations are likely to be implemented during the next five years, and if so, they will cause radical changes to Hong Kong's education system.

Bearing in mind that Hong Kong is a major player in world markets, the skills and expertise of its workforce are crucial to its international activities and to those with whom it does business. Consequently, it is very important for its education reforms, not only to improve general education and create new educational opportunities, but also to ensure that the system is able to provide young people with the knowledge and skills for employment and to prepare them for the world of work. Education reforms ignore these aspects of the system at their peril.

SUMMARY

Initially, in this paper, I shall provide a brief description of Hong Kong's current education system, and, in particular, how vocational education and training fits into it. This will be followed by a summary of the proposed education reforms and how they might affect the system, in particular, the introduction of Associate Degrees. Then, I shall discuss the place of vocational education and training in the reformed system, and finally, consider aspects of the future of organisations like the Vocational Training Council (VTC) in societies planning or implementing similar reforms.

THE PRESENT EDUCATION SYSTEM

Currently, the primary and secondary school system in Hong Kong comprises nine years of compulsory education, students being able to leave school after a secondary 3 education at about 15 years of age. The majority of young people continue with school education until at least secondary 5, at this stage they take Hong Kong Certificate of Education Examinations (HKCEEs), success in which can enable them to enter a two-year course leading to the Hong Kong Advanced Level Examinations (HKALEs), or to enter Diploma and Higher Diploma courses offered by the Vocational Training Council, City University of Hong Kong(City U) and Hong Kong Polytechnic University (Poly U).

The major provider of vocational education and training is the VTC which educates and trains around 120,000 students annually. It provides courses for 'non-academic' secondary 3 and 5 school-leavers, for secondary 5 school leavers with five or more HKCEE passes and for in-service trainees. Its highest level mainstream course is the sub-degree, Higher Diploma, success in the HKALE enables young people to compete for places on degree courses in Hong Kong's universities. A number of those who are unsuccessful in their HKALEs seek entry to Higher Diploma courses. (Diagram 1.)

THE EDUCATION COMMISSION REVIEW

The present review of Hong Kong's education system, which is being carried out by the Government's senior advisory body on education, the Education Commission (EC), has been accompanied by wide consultation and discussion over the last two years. It has now published its proposals for reform*.

The EC's review has been very wide-ranging and covers nearly the whole spectrum of Hong Kong's education system. Briefly, the main areas proposed for reform are as follows:

a) curriculum (at all levels);
b) assessment mechanisms;
c) obstacles to learning in the system;
d) the university admission system;
e) post-secondary learning opportunities; and
f) the application of resources.

Nevertheless, the EC Consultation Document does not address vocational education and training as a sector, and does not refer to it for reform. It also places great emphasis on student development particularly in terms of all-round abilities and positive attitudes, in preparation for life-long learning, and the importance of comprehensive and balanced learning attitudes, but places little emphasis on the role of education and training for employment.

For the purpose of its paper, I will only concentrate on the features which may affect significantly the shape and direction of post-secondary education, particularly in the vocational sector.

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*Note: *Review of Education System; Reform Proposals; Consultation Document* Published by the Hong Kong Special Administrative Region of The People's Republic of China, Education Commission

May 2000

Two main themes are very evident in the proposed reforms, first, the broadening of the education system to encourage the all-round development of the individual, and, secondly, creating more opportunity for education through life-long learning and clear progression paths (a 'seamless' system) to further education and qualifications.

Let us examine some of the more practical aspects of the proposed reforms which relate to these themes and explore how they may affect the future of the vocational sector. Diagram 2 summarises the proposed new system and the features of it which affect the shape of the post-secondary sector, the most significant are as follows:

a) the introduction of three years of senior secondary education in place of the current five years of secondary education;

b) replacing the two secondary examinations, HKCEEs (form 5) and HKALEs (form 7) with one secondary 'leaving' examination at form 6;

c) the introduction of Associate Degrees;

d) the addition of a new first year for university degrees to become four years of full-time study;

e) the implied inclusion of vocational education in the full-time post-secondary (community) college sector.

Apart from the fact that the review does not seem to address vocational education and training, one of the most significant effects of the proposed reforms on the vocational sector is likely to be the introduction of Associate Degrees in a 'seamless' education system. To consider this further it is necessary to be clear about the nature of sub-degree education in Hong Kong (that is education offered through the Higher Diploma), and this is described in the next section.

HIGHER DIPLOMAS AND ASSOCIATE DEGREES

The Higher Diploma (HD) in Hong Kong currently has over 12,000 students studying on it annually. Just over half of the HD places are provided by the Vocational Training Council, the rest are provided by the City University of Hong Kong (City U) and the Hong Kong Polytechnic University (Poly U).

In Hong Kong, the HD is a terminal qualification originally introduced to provide a course of study which educates and trains 'higher technicians' for commerce and industry. It has been designed as a three-year, full-time course with a five HKCEE entry, or a two-year, full-time course with a (one) HKALE entry.

It was never intended to articulate with degree programmes, however, in recent years there has been a tendency for more HD graduates to seek entry to degree programmes, normally, obtaining credit for their HDs such as they are able to enter the second year of a relevant three-year, full-time degree programme.

The EC's reform proposals encourage the universities in Hong Kong to develop new post-secondary sub-degree courses which can fit into a 'seamless' system allowing progression onto degree courses. These new courses, the Associate Degrees, can be two or three years full-time equivalent according to the level of entry qualifications. They are planned to fit into a progression ladder to provide the system shown in Diagram 2. One of the two universities currently offering HDs, namely, City U has already announced that Associate Degree courses will 'replace' their Higher Diploma programmes. In addition, continuing education providers such as Hong Kong University's School of Professional and Continuing Education (SPACE) are now offering Associate Degree as a pre-degree qualification. (See Annex).

The concept of the seamless life-long learning approach is laudable, but experience in other economies shows that if operated too comprehensively, it could lead to a lack of focus, and weaken the vocational sector. To illustrate this consider the current introduction in Hong Kong of Associate Degrees as part of the new seamless higher education system, as follows.

To be part of the system, Associate Degrees must be designed to fit the profile of the first two years of a four-year degree programme. This makes it difficult for them to be terminal qualifications, and eliminates the possibility of them being designed for employment and to be directly applicable to the needs of industry and commerce.

Let us now examine the future of the Higher Diploma once the Associate Degree has been introduced. It has already been pointed out that City U will replace its Higher Diplomas by Associate Degrees. In this context, it is important to realise that most young people who perform reasonably well at school would aim for a degree as first choice. Normally, an Higher Diploma is the second choice for those unable to get onto a degree course.

Considering the consumer's views about the new qualification, there is a strong likelihood that, given the choice, a school-leaver would prefer an Associate Degree course over an Higher Diploma for at least two reasons: First, the word 'degree' in the title has more status than 'diploma', secondly, the Associate Degree is shown to be part of a seamless progression ladder to enable those successful on it to enter the final two years of a four-year degree programme. (The nature of progression from an Associate Degree to a degree programme eventually must be faced by the consumers and the providers, as the seamless system is only a reality if the opportunities for degree study exist for all those successful on Associate Degrees. The availability of resources (and places) will dictate how many Associate Degree graduates can be accommodated on degree programmes.)

Clearly, the VTC, which will have the remaining (and only) Higher Diploma places will be competing for students with those organisations offering the more attractive Associate Degree.

The VTC's Higher Diplomas have been developed and designed in consultation with the employers. Placement and employment information shows that they are well-regarded and meet the needs of the employers. The specific vocational nature of this qualification is a selling point with the employers. However, it is the students (and to an extent their families) who will vote with their feet, and the image of the Associate Degree, with its promise of an 'automatic' entry to a degree programme can provide the encouragement for them to walk away from HDs.

It can be argued that the VTC's role in vocational education and training might easily be jeopardised if the seamless life-long learning approach coupled with the establishment of community colleges and the introduction of the Associate Degree become reality.

THE FUTURE OF VOCATIONAL SUB-DEGREE EDUCATION

If it is believed that a focused, dedicated vocational education and training provider such as the VTC has a significant part to play in modern society through the provision of vocational sub-degree programmes, then a way must be found to position and support it appropriately to the benefit of the students and the community. Furthermore, this should be done in such a way that young people choose such courses as the Higher Diploma as a valued alternative to the Associate Degree. This might be achieved by:

(i) Aggressive marketing exploiting the fact that Higher Diplomas are very practical and work related; a characteristic which is appreciated by both students and employers. This latter fact is verified by high employment rates which averaged 92% in 1999 despite the economic problems that prevailed at that time.

(ii) Negotiating with higher education providers to provide especially designed professional courses to enable Higher Diploma Graduates to gain degree equivalent qualifications leading to full professional recognition. It is also important for such courses to be included in a National Qualifications Framework. It will then be upto the students to decide which route they would wish to follow: the academic university route or the vocational route.

(iii) Promoting the facilities of organisations like the VTC which concentrate resources on employment related education and training programmes. Emphasis bas been given to project orientated teaching and learning activities and the fact that Higher Diplomas are very focused qualifications. By this it is meant that they are stand alone qualifications which fully equip graduates to function at the higher technician or middle management level as well as preparing them for more advanced study. This is unlike the Associate Degrees which are equivalent to the first two years of a four-year degree and are, therefore, not specifically work related or terminal qualifications.

(iv) Promoting the VTC's cost-effectiveness which results from it not having to sustain a degree level environment. It would, therefore be more cost effective to the tax payer if the VTC increased its sub-degree work at the expense of the Universities.

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(v) The VTC modifying its 3-year Higher Diploma structure to exempt Form 7 graduates from the first year; a change planned for the 2001/02 academic year. This modification will also facilitate a two-year Higher Diploma for the Form 6 school leavers in 2007, the date the educational reforms will probably come into effect as previously discussed.

(vi) Emphasising the fact that there are more than sufficient school leavers to support both Associate Degrees and Higher Diplomas, on the assumption that the current Form 5 pool, which will probably become the Form 6 pool in 2007, is around 80,000 students.

There are also crucial questions which have to be addressed in connection with the future of the VTC, in general these are:

(a) can the VTC and dedicated vocational education survive as part of a community college culture, with a seamless progression ladder covering the whole range of Hong Kong's education system and the qualifications offered; and

(b) should societies which espouse comprehensive, life-long seamless education systems also encourage and support dedicated focused education and training sectors such as those represented by the VTC? If so, is it a contradiction in terms for such a system to have this type of a sector?

There are, of course, many ways to answer these questions. In the UK, for example, the vocational and Associate Degree routes are clearly defined through the National Vocational Qualifications (NVQs) and the Associate Degree/Degree qualifications. The NVQ's are offered through a combination of the recognition of experience gained in the work place and attendance at Further/Higher Education Colleges, while the Associate Degree and Degree programmes remain in the control of the University Sector. Parity, or formal recognition of NVQ's, is achieved by bench marking them against the more traditional qualifications of 'O' levels, 'A' levels and Degrees. Another example may be taken from Australia where in Victoria in particular, the binary divide can be overcome by integrating the vocational, TAFE, colleges with universities. This has broken down, in both the eyes of the students and industry, the barriers between vocational and the more traditional university style of education. It must be emphasized that in both of these examples the respective governments played, and continue to play, an important role. These roles include financial support for vocational education and training and the enforcement of a Qualifications Framework.

In conclusion, the coexistence of, and indeed benign growth of both vocational education awards and Associate Degrees can best be facilitated if a seamless system of tertiary education is developed, one which resembles the Australian system where TAFE and degree awards are well integrated through recognition, validation and credit transfers. A Hong Kong equivalent of the Australian Qualifications Framework providing benchmarking for TAFE awards will also benchmark vocational qualifications against University awards. At the same time, through credit transfers and validation, graduates of vocational education will unequivocally be certain of their career and educational pathways, be they wishes to join the workforce or further their studies. Educationists and government officials alike should strive to achieve these goals in the near future in order that Hong Kong makes best of its human capital investment strategies.

ASSOCIATE DEGREE PROGRAMME OVERSUBSCRIBED

Among the 35,000 A-level students this year, only 14,500 obtained satisfactory examination results and were able to pursue higher education in the local tertiary institutions. Yesterday, more than a thousand F7 graduates with unsatisfactory results applied for the new associate degree courses offered by the University of Hong Kong and the Baptist University. The former alone received more than 600 applicants. This showed that there was a great demand for associate degree courses.

Starting from this year, students who were unable to enter university through the "normal route" could first obtain an associate degree and then apply for a bachelor's degree courses in local or overseas universities by means of that qualification.

The associate degree courses of each institution had their own characteristics. Students could choose the courses according to their own interest. Among the institutions, the Baptist University charged the highest course fees.

The Baptist University said that the associate degree courses were welcomed by F7 graduates. It was expected that more graduates would apply for these courses when they changed their choices.

The University of Hong Kong said that the associate degree courses received an overwhelming response. Many telephone calls enquiring about these courses were received. More than 600 applications were received in a day, which was the same as the number of places to be offered.

A student who had applied for an associate degree course of the University of Hong Kong was worried that the courses could not be linked up with the degree courses in all universities. She also feared that she might not be able to obtain a bachelor's degree eventually at a local university after completing the associate degree course. Although an associate degree course was more expensive, she said it was still worthwhile to apply for it since it could lead to a degree course eventually.

Taken from the Sing Tao Daily July 8th 2000

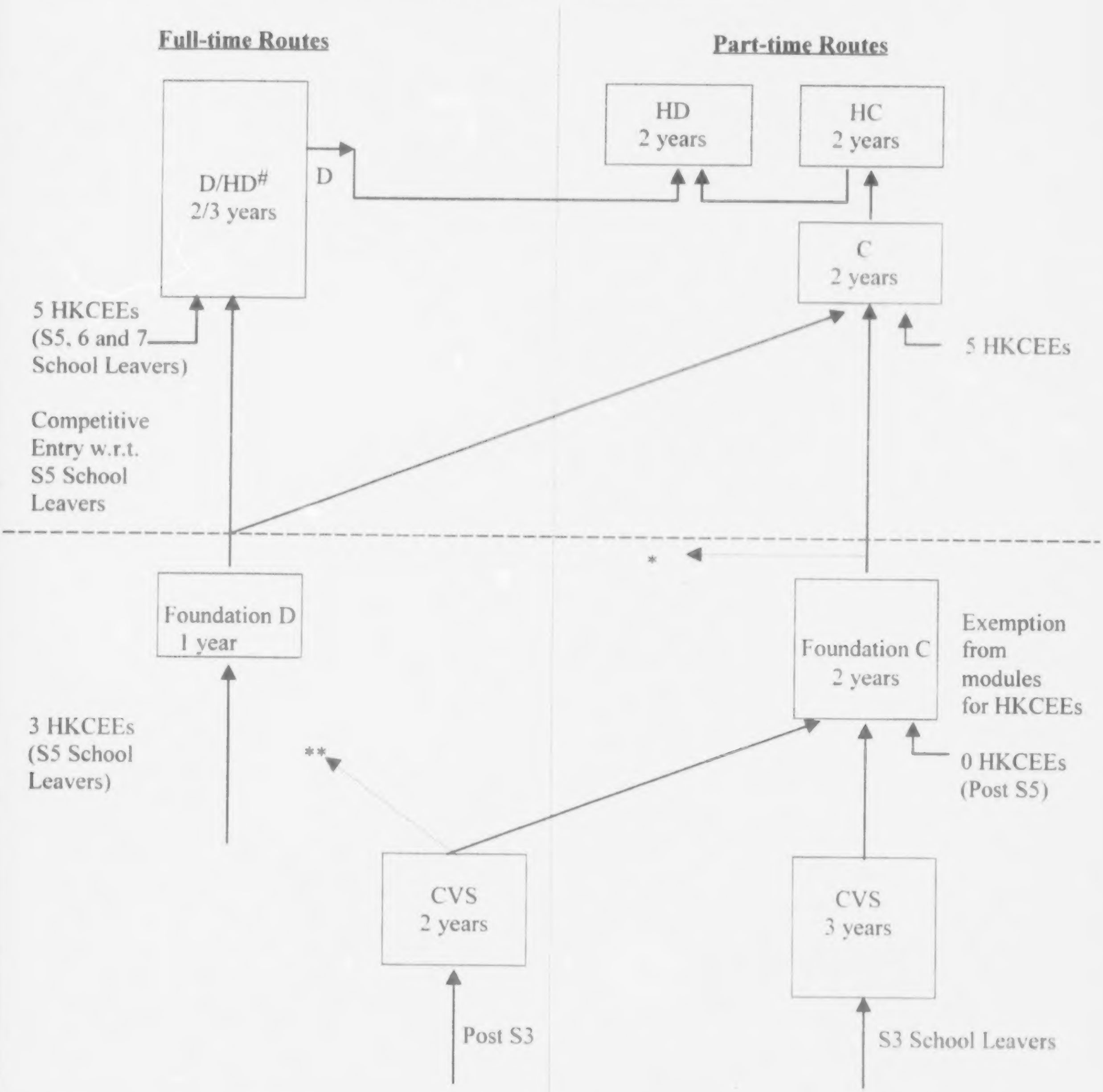
Associate Degree Programmes Offered by Local Universities

Institutions	Intake	Annual Course Fee	Duration	Subjects	Entry Requirements	Prospect
HKU SPACE Community College	about 600	$32,000-$40,000	2 or 3 years	- Accounting - Art & Design - Business Studies - Information Technology - Law - Nutritional Sciences	Completed F.5 – F.7; or Aged 21 above with working experience	Enroll in Year 1 to 3 of North American, British and local universities, depending on the courses taken
The Chinese University (School of Continuing Studies)	140	$35,000-$40,000	mainly 2 years, depending on the duration for earning 60 credit units	- Information Technology - Business, Economic & Management	Completed F.5 or above; F.7 graduates can be exempted from certain credit units	Year 3 of University of California, USA
The Baptist University of Hong Kong (School of Continuing Education)	300	$48,750	2 years	- Business - Communication Studies - Psychology - Computer Science/ Mathematics - Science & Technology - Languages	minimum 5 passes in HKCEE (including English Language)	- Year 1 or 2 of Baptist University or other local universities - Year 3 of Western Michigan University, USA - Year 2 or 3 of British, American and Australian universities
The Hong Kong Polytechnic University (School of Professional Education and Executive Development)	not yet confirmed	$31,575	2 years	- Hotel, Catering, Tourism Management - Rehabilitation Science - Engineering - Multi-media Design & Technology - Languages - Social Work	Completed F.7 with passes in Chinese and English Languages; Grade E or above in 1 A-level subject or in 2 AS level subjects and in 6 HKCEE subjects	the credit units earned will be recognized by the PolyU

Institutions	Intake	Annual Course Fee	Duration	Subjects	Entry Requirements	Prospect
The City University of Hong Kong (College of Higher Vocational Studies)	not yet confirmed	$31,575	2 years	- Building Science & Technology - Language Studies - Commerce - Social Studies - Computer Studies - Creative Media Studies	ditto	- Year 2 of CityU - overseas universities

DIAGRAM 1

IVE MAINSTREAM COURSES FROM 1999


Full-time Routes
Part-time Routes
D/HD#
2/3 years
D
HD
2 years
HC
2 years
C
2 years
5 HKCEEs
(S5, 6 and 7
School Leavers)
5 HKCEEs
Competitive
Entry w.r.t.
S5 School
Leavers
*
Foundation D
1 year
Foundation C
2 years
Exemption
from
modules
for HKCEEs
3 HKCEEs
(S5 School
Leavers)
**
0 HKCEEs
(Post S5)
CVS
2 years
CVS
3 years
Post S3
S3 School Leavers

* Exceptional students may be able to compete for places on the D/HD.

** Exceptional students may be able to gain entry to the Foundation D.

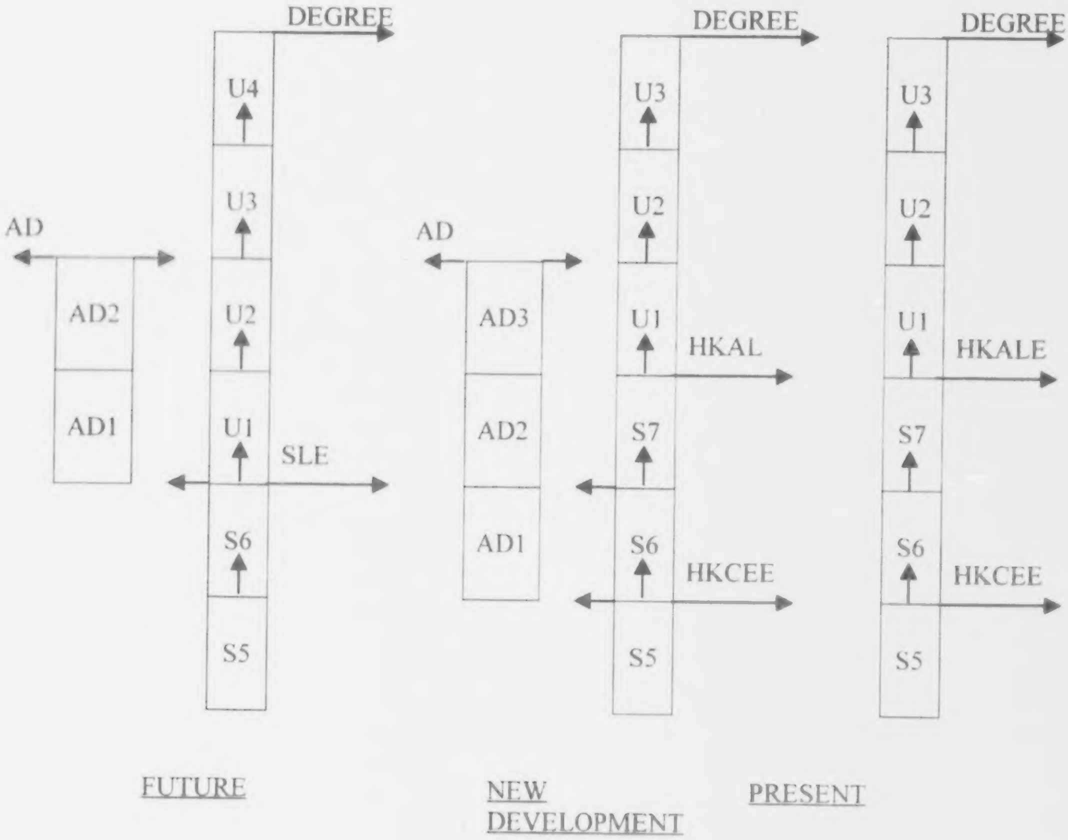
# There are also some stand alone Diplomas and Higher Diplomas.

Key

HD:	**Higher Diploma**
D:	Diploma
HC:	Higher Certificate
C:	Certificate
CVS:	Certificate in Vocational Studies

DIAGRAM 2

ACADEMIC ROUTES TO A DEGREE


DEGREE
U4
U3
U2
U1
SLE
S6
S5
AD
AD2
AD1
FUTURE
DEGREE
U3
U2
U1
HKAL
S7
S6
HKCEE
S5
AD
AD3
AD2
AD1
NEW DEVELOPMENT
DEGREE
U3
U2
U1
HKALE
S7
S6
HKCEE
S5
PRESENT

KEY:

S ≡ SECONDARY EDUCATION

U ≡ UNIVERSITY EDUCATION

AD ≡ ASSOCIATE DEGREE

HKAL ≡ HONG KONG ADVANCED LEVEL EXAMINATION

HKCEE ≡ HONG KONG CERTIFICATE OF EDUCATION EXAMINATION

SLE ≡ SECONDARY LEAVING EXAMINATION

Printed by Advanced Printing Technology Centre
Hong Kong Institute of Vocational Education (Kwun Tong)

ATTITUDES OF UNIVERSITY FACULTY MEMBERS TOWARD STUDENTS WITH DISABILITIES

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Index: Special Needs; Educational Opportunity; Social Responsibility

Abstract: American colleges and universities are experiencing a continuous enrollment of students with disabilities, especially students with learning disabilities. The Americans with Disabilities Act mandates that institutions of higher education provide full accommodations and services to all students. This study was conducted to ascertain the attitudes of university faculty members toward serving students with disabilities. Seventy-one faculty members representing three broad academic areas in a university in the Southeastern Region of the United States participated in this study. Results of the data analysis revealed statistically significant differences existed between faculty members when they were grouped by academic rank and academic unit.

INTRODUCTION

A study by Fichten, Amsel, Bourdon, and Creti (1988) found that although professors are experts in their respective disciplines, most do not feel they are experts in adapting their courses to students with disabilities. Leyser (1989) found that a large majority of faculty supported the integration of students with physical and sensory disabilities; however, they were less supportive of students with learning disabilities and emotional disabilities. The Leyser study also found that less than one half of the 124 faculty members surveyed were using the resources and support services available to assist students with disabilities.

The removal of architectural barriers on college campuses has been a primary goal of most institutions. However, as Newman (1976) stated: " . . . the barriers to accessibility on college campuses to the handicapped are not only physical . . . attitudinal barriers are at least as salient." Nathanson (1982) reported that faculty attitudes and perceptions are influenced by the amount of contact they have with students with disabilities. Nathanson found that faculty emotions, perceptions, assumptions, beliefs, and expectations all play an integral part in the faculty and student relationship. Jarrow (1987) reported that research evidence indicates that attitudinal barriers are as much a matter of what we say as they are a matter of what we do; but given appropriate support, students with disabilities can be successful in pursuing a postsecondary education.

The increased number of students with disabilities who are being served in higher education and the demands of this population make it imperative that university faculty members be prepared to serve these individuals effectively. Students with disabilities need the assistance provided by a disability services office as well as accommodations in the classroom. Faculty members within each institution of higher education have a legal responsibility to provide accommodations to qualified students with disabilities. An assessment of the current attitudes of faculty members may be helpful in planning, designing, and implementing professional development programs to prepare faculty to serve students with disabilities effectively and efficiently in the regular classroom.

Statement of the Research Problem

Students with disabilities face many of the same challenges as other students as they pursue their college studies. Some students are concerned about the lack of awareness of their unique requirements by college and university faculty members. Attitudinal barriers should not be ignored when striving to provide equal access to higher education for students with disabilities. The attitudes of university faculty members may be a significant determinant in the successful completion of educational experiences for students, with or without disabilities. The lack of information related to the attitudes of university faculty toward serving students with disabilities provided the focal point for this research.

Purpose of the Study

A review of the literature revealed no studies have been completed related to the attitudes of faculty members at small, regional public teaching institutions. The purpose of this study was to investigate the attitudes of faculty members toward serving students with disabilities at a small, regional university in the southeastern region of the United States. Attitudes were examined in relation to selected demographic variables of faculty members.

Research Question

The following research question served to guide this study.

To what extent is there a difference in attitudes of university faculty toward serving students with disabilities as measured by the Survey of Faculty Attitudes Relative to Serving Students with Disabilities questionnaire when faculty are grouped by (a) gender, (b) age, (c) academic rank, (d) academic unit, (e) years of teaching experience, and (f) extent of contact with students with disabilities?

Definition of Terms

Auxiliary aids and services—the term, "auxiliary aids and services," includes (a) qualified interpreters or other effective methods of making aurally delivered materials available to individuals with hearing impairments, (b) qualified readers, taped texts, or other effective methods of making visually delivered materials available to individuals with visual impairments, (c) acquisition or modification of equipment or devices, and (d) other similar services and actions (Americans with Disabilities Act, 1990).

Disability—the term, "disability," means, with respect to an individual: (a) a physical or mental impairment that substantially limits one or more of the major life activities of such individual, (b) a record of such an impairment, or (c) being regarded as having such an impairment (Americans with Disabilities Act, 1990).

Reasonable accommodation—the term, "reasonable accommodation," may include making existing facilities readily accessible and usable by individuals with disabilities (Americans with Disabilities Act, 1990).

Limitations of the Study

1. Only faculty members employed in one small, regional university in the southeastern region of the United States were included in this study.
2. Results were limited to the extent that faculty members responded with their honest feelings.
3. Results were limited to the extent that the research instrument measured the true feelings of the faculty members.
4. A non-response bias may have existed in the non-return rate.

Assumptions of the study

1. Responses to items on the research instrument indicated the true feelings of faculty members.
2. Faculty members had some previous knowledge of the rights of students with disabilities according to legislative mandates.
3. Faculty members had some previous experience interacting with a student with a disability in a classroom setting.
4. The survey instrument was sensitive to faculty attitudinal characteristics.

METHODS AND PROCEDURES

Sources of Data and Collection Procedures

The research instrument and demographic data form were administered to all 106 faculty members employed at a small, regional teaching university in the southeastern region of the United States. Useable data were collected from 32 full-time faculty members and 39 adjunct faculty members. The number of males and females were almost evenly divided, with 35 males and 36 females. The researcher administered the survey instrument and a demographic data sheet in January 1999 to the faculty during a faculty convocation session. Faculty members completed the demographic data sheet and the survey instrument during the convocation session.

Instrumentation

The Survey of Faculty Attitudes Relative to Serving Students with Disabilities instrument was used for this study. This is a 30-item instrument to which participants responded using a Likert-type scale with a range from 5 for "Strongly Agree," to 1 for "Strongly Disagree." Some items are written with positive connotations and some with negative connotations. Sample items include statements such as, "Inclusion of students with disabilities will require significant changes in classroom procedures" and "Inclusion of students with disabilities will necessitate extensive retraining of faculty." A score could range from 30 to 150, with a higher score indicating a more favorable attitude toward students with disabilities.

Procedures for Data Analysis

Data were analyzed using the Statistical Packet for the Social Sciences (SPSS). A one-way analysis of variance statistical procedure (ANOVA) was used to test for differences in mean scores between groups for each of the six independent variables. The .05 level of significance was used. Differences in mean scores were tested between groups when data were grouped as follows: (a) gender, (b) age, (c) academic rank, (d) academic unit, (e) number of years of teaching experience, and (f) extent of contact with students with disabilities. Minimum and maximum scores, mean scores, and standard deviations were computed for the demographic data.

Results

No statistically significant differences were found for the following variables: (a) gender, (b) age, (c) years of teaching experience, or (d) previous contact with students with disabilities.

The F-ratio of 4.138 indicated statistically significant differences between mean scores for academic rank. Faculty members who did not hold academic rank (instructor and adjunct) had higher mean scores (Mean Score=86.69; SD=6.19) than faculty members who held academic rank (Mean Score=83.50; SD=6.80). The lowest score for the non-academic ranked faculty was 77 and the highest score was 105, whereas the lowest score for faculty who held academic rank was 71 and the highest score was 98.

The F-ratio of 4.337 indicated statistically significant differences between mean scores for academic unit. The mean score for the College of Arts and Sciences (Mean Score=88.16; SD=7.94) was higher than the mean scores for the School of Business (Mean Score=84.48; SD=5.11) and the School of Education (Mean Score=82.96; SD=5.17).

The mean score for all participants was 85.30 with a standard deviation of 6.61. The minimum score for all participants was 71 and the maximum score was 105.

CONCLUSIONS

Overall, faculty members held generally positive attitudes toward serving students with disabilities; however, academic rank and academic units were indicated as statistically significant variables related to faculty attitudes. It appeared that faculty members who did not hold academic rank had more positive attitudes toward serving students with disabilities than faculty members who held academic rank. In addition, faculty members in the College of Arts and Sciences appeared to have more positive attitudes than faculty members in the School of Business and the School of Education. Results of this study suggested that the attitudes of faculty members in this study were similar to faculty attitudes reported in similar studies at other higher education institutions (Fonosch & Schwab, 1981; Schoen, Uysal, & McDonald, 1987). In the Fonosch and Schwab study, results indicated that most faculty members held positive attitudes toward students with disabilities. Faculty members who used more than the lecture method had more positive attitudes toward serving students with disabilities than those who used the lecture method only. Schoen et al. reported that faculty members generally held positive attitudes toward students with disabilities in relation to classroom management issues and compliance with legislative mandates.

Faculty members in the School of Education held the least positive attitudes of serving students with disabilities. This may have been due to the professional stress these faculty members have experienced in recent years. For example, changes in university leadership, increased use of technology, changes in curricula, transition requirements from the quarter to semester system, renewal of accreditation, and lack of faculty input for many of the changes. The combination of countless changes may have taken away some of the concern normally shown to students. In addition, faculty members with academic rank may have answered more frankly due to the fact that they typically are tenured and may feel more secure than their non-ranked, non-tenure track counterparts. Many students transfer into the university from two-year postsecondary institutions; therefore, faculty members who do not hold academic rank may have limited contact with these students due to the fact that they usually teach entry-level courses.

Finally, faculty members in the School of Education may have indicated the least positive attitudes due to doubts that they may have relative to the ability of students with disabilities to master new material and to use assistive technology effectively.

RECOMMENDATIONS

Data for this study included faculty members at only one small, regional university campus; therefore, caution should be taken in generalizing the results beyond institutions similar to the one in this study. Additional research could be conducted at other similar universities to provide a larger data base. A larger data data base may provide a more comprehensive view of faculty attitudes.

Nathanson (1982) suggested that the attitudes of college faculty might have a profound impact on the educational and social integration of students with disabilities. Fichen, Goodrick, Tagalakis, Amsel, and Libman (1990) suggested that faculty attitudes might translate into behaviors that could either facilitate or impede the college experience for students with disabilities.

Additional research may be helpful in assessing the professional development needs of university faculty toward serving students with disabilities. For example, special training programs may help faculty members to increase their knowledge relative to the nature of various disabilities and appropriate accommodations, compliance with legislative mandates, and the use and incorporation of assistive technology into their instructional programs.

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ATTITUDE OF GAMING EMPLOYEES TOWARDS PROBLEM GAMBLING: HOW IT AFFECTS THEIR LEARNING AT AN AWARENESS TRAINING

Ms. Lisa M. Bybee

Index: Adult learning, Training evaluation, Problem gambling

Abstract: The purpose of this study: Analyze the efficacy of a problem gambling training class to train adult learners and determine whether the attitude of this sample towards problem gambling affects their ability to learn about this issue. A survey instrument was designed by the author. The researcher used frequency distribution, crosstabulations, and linear regression to analyze the collected data. The survey sample consisted of adult gaming employees in Las Vegas who attended compulsory problem gambling awareness training.

INTRODUCTION

The purpose of this study is to analyze the efficacy of a problem gambling training program to train adult learners and to determine whether the attitude of this sample towards problem gambling affects their ability to learn about this issue. The survey sample consists of adult gaming employees in Las Vegas who attended a compulsory problem gambling awareness training class.

Importance of the Study

This study will first endeavor to discover whether the attitude of trainees towards problem gambling affected their ability to learn the objectives presented in the class and second evaluate the training program. The program offered by the Nevada Council on Problem Gambling is the first of its kind in Las Vegas outside of a casino or hotel property.

Problem gambling has been a controversial topic of debate among gaming proponents and opponents for at least 15 years and has become a more politicized issue in Nevada, and other states with legalized gambling, during the past few years. Indeed, it has been difficult for interested parties (clinicians, the gaming industry, the general public, and people with gambling problems) to come to an agreement on just what problem gambling is.

The pre-test occurred at the beginning of October. Ten completed surveys were obtained. Because the responses were acceptable – no questions seemed to pose any problems – no part of the survey was changed. As a result, these 10 surveys were added to the 45 that had been collected by December. Thus, a total of 55 useable surveys were obtained with a response rate of 100%.

Hypotheses

1. Do women have a different attitude towards this training than men?
2. Will attendees with no prior exposure to problem gambling training retain more information than those attendees who have had prior problem gambling training?
3. Do people with positive attitudes retain more information than those with negative attitudes?

The study used a convenience sample. The survey sample was restricted to gaming employees in Las Vegas who attended a compulsory, off-site problem gambling awareness training ("open enrollment" option) offered by the Nevada Council on Problem Gambling. The researcher was solely responsible for administering the survey to the sample.

Review of Related Literature

The review of literature is divided into the following six parts: Background (problem gambling and an outline of the Nevada Council on Problem Gambling's Awareness Training Program); Problem Gambling; Adult Learning; Attitude Measurement; Training Program Design; and, Training Evaluation. Only the Background section is included here.

Background

In 1931, Assembly Bill 98 was passed legalizing gambling in Nevada. During November 1998, a gaming regulation was passed requiring gaming establishments to address problem gambling. The debate over just what problem gambling, or compulsive gambling, or gambling addiction really is has raged among clinicians, the gaming industry, the general public, and people with gambling problems for years. While gambling as a recreational activity has been widely practiced and accepted, problem gambling has remained a difficult issue to define and address for all interested parties.

The journey to the regulation's passage and implementation was recorded by one of the city's newspapers – the Las Vegas Sun – and revealed much about the volatility of the issue and the opinions of various groups inside Nevada. A June 1998 article discussed the 12th National Conference on Problem Gambling. Medical professionals, executives from the gaming industry, and anti-gambling representatives met in Las Vegas over three days to discuss problem gambling. It was noted that such a large and varied gathering would not have occurred a few years before. Dr. Howard Shaffer presented results from earlier research that studied underage gambling and gambling addiction among teens (Thompson,1998).

By September of 1998, the gaming industry in Nevada was feeling the pressure of a study being conducted by a federal commission – the National Gambling Impact Study Commission – studying problem gambling nationwide. The general feeling of Nevada casino operators and gaming interests was that they needed to address problem gambling issues themselves before some other legislative body intervened (Wilen,1998).

In November 1998, the Nevada Gaming Commission and the State Gaming Control Board passed a regulation that addressed problem gambling in 4 ways: 1.) all gaming properties, with restricted or unrestricted licenses, are subject to the regulation; 2.) the help-line number (1-800) has to be posted in gaming areas; 3.) employees who work in gaming areas are required to be educated about the issue and trained how to assist customers who request information; and, 4.) gaming properties must discontinue sending casino marketing information and issuing credit to customers who request it (Regulation 5.170,1998). The Nevada Council on Problem Gambling is the recognized provider of problem gambling awareness training available to gaming properties.

The gaming industry revealed publicly that it acted to pass legislation quickly, the night before a scheduled visit in Las Vegas of the federal Commission, and eight months before the results of their study were released (Wilen,1999). By May 1999, casino operators had begun to suggest that all of the controversy surrounding problem gambling and the need for recently passed legislation had been overstated. The high incidence of problem gambling in the local and general population and personal bankruptcies in Las Vegas were the result of growth, not gambling (Strow,1999).

In June of 1999, the month that the federal report's results were to be made public, gaming interests, while applauding themselves for passing the regulation, went out of their way to point to several studies which suggested that the percentage of problem gamblers in the general population was very small (Wilen,1999). The very next day Steve Wynn, casino magnate and influential gaming industry persona, commented that the results of the federal report would prove to be harmless to the gaming industry and, instead, would help to promote the industry as a financial powerhouse and economic savior of many communities and states in the country (German,1999).

One week after Wynn's comments, on June 18, 1999, the National Gambling Impact Study Commission released the results of its research. Among the highlights of the Commission's recommendations under the problem and pathological gambling section: "contract with a state-recognized gambling treatment professional to train management and staff to develop strategies for recognizing and addressing customers whose gambling behavior may strongly suggest they may be experiencing serious to severe difficulties" and "...respectfully and confidentially provide the customer...with written information that includes a state-approved list of professional gambling treatment programs" (NGISC Report,1999).

The national press commented on the events unfolding in the gaming industry as the result of the Commission's report. Overholser (1999) pointed out that, while important, the report seemed to take a soft approach to the spread of gambling nationwide due to the Commission's membership including an influential Las Vegas CEO. By the end of June 1999, the local press began to profile famous individuals who had suffered from gambling addiction – in order to put a familiar face on the issue (DiMeglio, 1999; Arnold, 1999).

It is in this atmosphere of mistrust – on the part of some in the gaming industry who believe that it was forced to regulate itself and gambling opponents who believe that the spread of gambling nationwide is responsible for the problem – that the Nevada Council on Problem Gambling began to offer its problem gambling awareness training to employees of Las Vegas gaming establishments.

Nevada Council on Problem Gambling's Training

The problem gambling training class offered by the Nevada Council is presented to class attendees in 75 minutes. An outline of the program's objectives, given to attendees at the beginning of the class, is reproduced below:

I. Introduction and Objectives
II. Defining Social and Problem Gambling
III. When the Fun Stops video presentation
IV. Impact of Problem Gambling
V. Solutions for Problem Gambling
VI. Summary and Review
VII. Quiz

(Source: NVCPG's When the Fun Stops participant handout, 1999).

Class attendees are told throughout the introduction that the training class is 75 minutes in length – something the Council states to trainees in order to reassure them that their time commitment is relatively short. The length of the video, 28 minutes, is also given to attendees at the beginning of the class. Finally, the quiz to be given at the end of the class is presented as an integral part of their attendance since its completion will allow the Council to give each participant a card signifying that an individual took the class.

The first objective of the training is to explore the definitions of problem gambling and social gambling – their differences and similarities. Next, the warning signs of problem gambling are covered. This section is designed to further separate social gambling's aspects from problem gambling's symptoms. The *When the Fun Stops* video is then shown. The video uses three recovering problem gamblers and their stories, along with a noted problem gambling therapist, Dr. Hunter, to present the issues of the training in a sensitive yet reality-based format. The phases of problem gambling are presented in the video in order to give structure to the experiences of the three individuals profiled. Following the video presentation, the impact of problem gambling on the individual, family, friends, and co-workers is described.

Solutions to problem gambling, i.e., support groups available to the public, the hotline number, and professional resources, are then given. A review of the individuals in the video, how they resolved their gambling addiction, availability of treatment, and the importance of knowing the difference between problem and social gambling is presented. Finally, after more than an hour, the role of the gaming employee is reviewed. They are to know where brochures and information – especially the hotline number – are posted in the workplace; that there exist support groups for those who ask for help; and, not to approach customers about this issue.

Class attendees are then given time to complete the Council's quiz. It reviews the basic objectives and information presented in class. The attendees are told not to view the quiz as a pass/fail test of their knowledge of problem gambling since the trainer will go over each question with the class and provide the correct answers.

Summary

Women were more interested in taking the training class than men and they responded positively to the seriousness of the issue from the beginning. The results for *hypothesis one* indicate that women may be more positive towards the training because they view the training as an opportunity to learn about a social issue.

Women may have a more positive attitude towards the training because, traditionally, they have had more personal contact with gambling patrons through their jobs at gaming establishments. In addition, the fact that half of the women answered "very interested" and "interested" suggests that their interest to learn about problem gambling is associated with their perceived social roles in the workplace.

The results for *hypothesis two* indicate an automatic response to survey questions in that those who had previous training were more likely to have responded that they had "learned little that was new" from the training. These respondents may have thought they knew all they needed to know about problem gambling due to their prior job training or personal experience. This suggests that their attitude towards the training and confidence in their knowledge prevented them from learning something new.

In addition, the way in which respondents with or without previous training responded to questions about what they learned at the training, as noted in the high response rates for "learned little that was new" and "did not learn anything new", could mean that respondents really do not know if they learned anything new about problem gambling from the training since they do not know the outcome of their efforts. These responses may also be due to the compulsory nature of the training.

The results for *hypothesis three* indicate the sample's attitude towards learning about problem gambling. Those respondents who were "very interested" and "interested" in the training at the beginning, had more positive answers for "did you learn something new" and "is problem gambling a serious issue" suggesting their positive approach to the training influenced what they learned.

Participation in adult education is driven by several factors including employment status. In other words, respondents were at this training because of their employers (or potential employers) not because they wanted to become more knowledgeable about problem gambling. The necessity of performance feedback from the instructor, and for instructors to take into account prior experience when designing curriculum, are vital parts of the adult learning process.

In both regression models "how interested are you in this class" is a significant independent variable. This was expected since the crosstabulation results showed a positive correlation between interest in the class and "did you learn something new".

What matters more: Age, gender, previous training, or attitude? The regression analysis shows that attitude – responses to "interest" and "opinion" questions – is the variable that is the most significant for this sample.

CONCLUSION

The author's experiences at the Council's training sessions suggest that the approach to the training by the Council illustrates its desire to get its message across to participants in the shortest time possible in order to minimize the frustration (negative attitudes?) that attendees may have towards attending the training. The length of the video, 28 minutes, is also given to attendees at the beginning of the class – possibly for the same reasons. The desire to train attendees in the shortest amount of time is cost-effective but are the content and organization of the class sacrificed in the process?

While the presentation of objectives follows a paradigmatic training format one major element to teaching adults successfully is left out completely: active participation of class attendees. Although the Council would argue that this element is not possible to include due to time constraints, participation is an essential aspect of adult learning methodology. Furthermore, the use of a quiz that does little to test the newly acquired knowledge of participants might very well neutralize any actual retention of information because the trainer provides the answers for the adults and still gives a reward for their efforts (the card). The review of literature shows that this goes against the tenets of adult learning theories and training design. Adults must have a stake in their learning and must be able to show themselves and others what they have learned in order to feel successful.

The purpose of the Nevada Council's training is to increase gaming employees' awareness of problem gambling issues in compliance with a recently passed gaming regulation. Is the training successful using this as a criteria? In terms of adult learning methods, the training falls short as suggested by the lack of trainee participation and the testing of acquired skills. The training is a success when training design is considered since the objectives of the training are stated clearly at the beginning of the class and the class format is structured around the stated plan. However, the end of the class deteriorates into a last minute attempt to have attendees remember just one thing – the problem gambling telephone number. This suggests to attendees that the earlier part of the training (the phases of problem gambling, the personal devastation it causes) was not as valuable or important for them to know as a telephone number.

What makes this topic, problem gambling, provocative is that people have difficulty accepting that the pursuit of the intangible product of gambling – entertainment – can have a deleterious effect on a person. The passage of a problem gambling regulation, whatever the motivation, and the existence of the Nevada Council on Problem Gambling's awareness training classes are positive signs that the gaming industry is committed to addressing this issue.

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DEFINITION OF TERMS

The following definitions are from various sources including the Nevada Council on Problem Gambling's informational brochure and training class handouts:

Problem gambling: General term used to describe a disorder whereby an individual is unable to stop gambling on their own. They cannot limit the amount of time or money spent gambling. They gamble to the exclusion of other activities and the end result is often financial bankruptcy, depression, and suicide. Same thing as pathological gambling, compulsive gambling, and gambling addiction. Differs from social gambling.

Social gambling: Gambling activity that is for entertainment purposes. The gambler limits the amount of time and money gambled and gambles for social distraction. How the majority of the general public gambles.

Compulsive gambling: Another term used by people who are in treatment for gambling addiction. The same thing as problem gambling.

Pathological gambling: The term used by the medical community for problem gambling. Also refers to gambling addiction. Typically used by lay people, i.e., the press and general public.

Gambling addiction: The term that "problem gamblers" use to describe their gambling problem. Typically used by those who are in treatment or post-treatment.

Gambler's Anonymous: Also referred to as GA. This is a free treatment organization for problem gamblers. The phases of the program follow the "12 Step" method used by Alcoholic's Anonymous.

Convenience sample: A population sample that is not randomly chosen.

PLEASE NOTE: A complete copy of this thesis, including tables, literature review, sample survery, and recommedations can be obtained from the author.

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QUANTITATIVE EVALUATION OF THE EDUCATIONAL PROGRAMMES ON STUDENTS' AWARENESS OF SOCIAL RESPONSIBILITY

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Abstract: As discrimination and hazardous working conditions have been constituting social costs in the Hong Kong economy, legislative progress in enforcing equal opportunity, safety and health at work becomes obvious with the enactment of discrimination ordinances and the Occupational Safety and Health Ordinance in 1997. Educational programmes were being conducted for students to realise such social responsibility soon after they graduate. The evaluation of the educational programmes is based on the empirical data collected after the delivery of educational packages.

SCOPE

This essay attempts to quantitatively evaluate social studies as part of vocational education programmes. The evaluation is made on the students' awareness of social responsibility imposed by recent enactment of discrimination ordinances (L.N. 556 of 1996 operative on 1.7.1997 & L.N. 552 of 1997) and Occupational & Safety Ordinance (L.N. 281 of 1997).

SOCIAL STUDIES IN THE CONTEXT OF VOCATIONAL EDUCATION

Social studies search for new social development and apply sociological knowledge to practical situations (Horton 1984). As institutionalised vocational educational programmes are aimed at training employees, social sciences and humanities are included to give the future executives a well-rounded college education (Horton 1984).

In the context of vocational education, students owe a duty of care to the community whenever they acquire technical knowledge in the institute. This duty of care is the standard of the degree of care and skill that was expected to be applied with the skill of the type of person or professional that he or she claims to be (Bachner 1996). The standard of foresight of a technically trained employee is independent of the idiosyncrasies of the particular person whose conduct is in question (Bachner 1996). Social studies included in the vocational education programme serve to prescribe normative morality affirmed by the Hong Kong society.

ENFORCEMENT OF EQUAL OPPORTUNITIES AT WORKPLACE SPECIFIED IN THE LAWS OF HONG KONG

Genuine equality of opportunities is recognised as a positive action against discrimination (Malone 1993). In Hong Kong the Equal Opportunities Commission administers the discrimination ordinances. Besides promoting equality of opportunity, the Commission also works towards elimination of sexual harassment (Cap.480 s.64)

Liability of employers is vicarious that anything violating the discrimination ordinances done in the course of employment shall be treated as done by the employer, whether or not it was done with his knowledge or approval. Supervisors and professionals also share the same vicarious liability that anything done by a person with the authority of that other person shall be treated as done by that other person as well as by him (Cap.480 s.46 and Cap.527 s.34).

ENFORCEMENT OF OCCUPATIONAL SAFETY & HEALTH AT WORKPLACE SPECIFIED IN THE LAWS OF HONG KONG

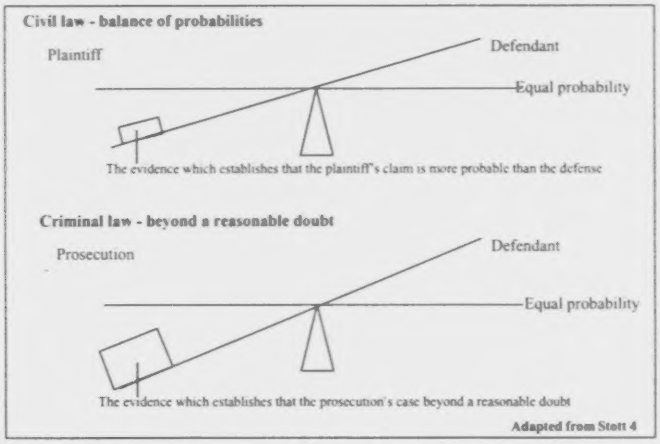
The long title of the Occupational Safety & Health Ordinance (Cap. 509) stipulates the intention of the Ordinance as follows:

> An Ordinance to ensure the safety and health of persons when they are at work, to provide for related matters, and to consequentially amend the Factories and Industrial Undertakings Ordinance and the Administrative Appeals Board Ordinance.
>
> Long title of Cap.509 (Laws of Hong Kong)

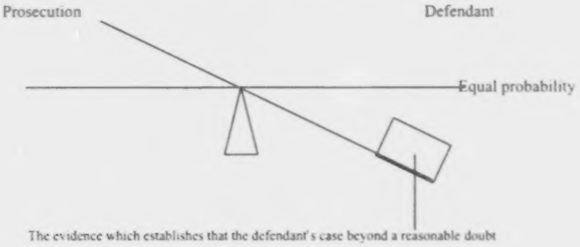
The punitiveness from legal violation is best illustrated by citing section 38 of the Ordinance as follows:

> **Onus on defendant to prove certain matters**
>
> In proceedings for an offence against this Ordinance involving a failure-
>
> (a) to comply with a requirement or an obligation that has to be complied with only in so far as it is practicable or reasonably practicable to do so; or
>
> (b) to take steps , reasonable steps or reasonably practicable steps to comply with the requirement or obligation,
>
> the onus is on the defendant to establish that compliance with the requirement or obligation was not practicable or was not reasonably practicable,...to comply with the requirement or obligation.
>
> s.38 of Cap.509 (Laws of Hong Kong)

The following diagrams may summarise the standards of proof required by Cap.509 s.38:


Civil law - balance of probabilities
Plaintiff
Defendant
Equal probability
The evidence which establishes that the plaintiff's claim is more probable than the defense
Criminal law - beyond a reasonable doubt
Prosecution
Defendant
Equal probability
The evidence which establishes that the prosecution's case beyond a reasonable doubt
Adapted from Stott 4

Occupational Safety & Health (Cap.509) - beyond a reasonable doubt


Prosecution
Defendant
Equal probability
The evidence which establishes that the defendant's case beyond a reasonable doubt

EDUCATIONAL PROGRAMME ON STUDENTS' AWARENESS OF SOCIAL RESPONSIBILITY

The objective of the educational programmes is to enhance students' awareness of social responsibilities in enforcing a fair and safe system of work. Diagrams (see last paragraph) and sets of discussion material (see appendix) were distributed when the groups of students assembled. The task was to analyse the scenarios listed and show value judgements by marking options provided in the discussion material. During discussion, opinions were aired, information was exchanged, questions were asked and the subject matter was probed from all angles. Every member in the group speculated freely; new ideas were formulated, accepted, modified or rejected; and the previously overlooked were brought into focus and reviewed. At the conclusion of the discussion, follow-ups took the form of a summary and action along the lines of group recommendations.

Empirical data (i.e. the markings in the discussion material) were collected for evaluating the achievement of the educational objective. Hypothesis testing was carried out to evaluate the effectiveness of programmes' delivery.

HYPOTHESIS TESTING

The statement of problem is,

"Can the educational programmes enhance students' awareness of social responsibility in enforcing a fair and safe system of work?"

The question of investigation is,

"Is there a correlation between the punitiveness from legal violation, and the realisation of social responsibility to maintain a fair and safe system of work?"

The quantitative analysis of investigation results provides solution to the problem statement. As the discussion material was so designed to draw students' attention to the punitiveness of Hong Kong Law to discrimination and hazardous working actions, positive investigation results showed that the material was effective, whereas negative results showed that the material was not effective to let students realise their social responsibility on considering the punitiveness on legal violations.

QUANTITATIVE ANALYSIS OF INVESTIGATION RESULTS ON STUDENTS' AWARENESS OF SOCIAL RESPONSIBILITY

The data tabulated below show the observed scores, n, for unlawful scenarios, from (a) to (e), classified by categories of responsible person.

responsible person	n	Scenario (a)	Scenario (b)	Scenario (c)	Scenario (d)	Scenario (e)	total	Relative frequency Pj
institute & individual		4	5	5	4	4	22	0.51
individual only		4	5	3	2	3	17	0.4
institute only		0	2	0	2	0	4	0.09
total		8	12	8	8	7	43	
Relative frequency Pi=		0.19	0.28	0.19	0.19	0.16		

Let Pij denote the underlying multivariate probability distribution whereas Pi and Pj denote the marginal probability distributions. Then the null hypothesis of statistical independence is stated that

Ho: Pij – PiPj

To test how well the data fits this hypothesis, I tabulated the 4 steps for chi-square calculations to test for dependence as follows.

Step 1

Assuming independence, the data tabulated below estimates the multivariate probabilities, Pij, which equal to the multiplication of marginal probabilities, PiPj.

Pij						Pj
	0.1	0.11	0.09	0.07	0.079	0.44
	0.07	0.08	0.03	0.05	0.061	0.34
	0.05	0.05	0.04	0.04	0.04	0.22
Pi	0.22	0.24	0.2	0.16	0.18	

Step 2

The data tabulated below calculates the expected frequencies, E, which equal to the observed scores, n, multiplied by the underlying multivariate probability distribution, Pij. (i.e. E = nPij)

4.16	4.54	3.78	3.03	3.41
3.22	3.51	1.09	2.34	2.63
2.08	2.27	1.89	1.51	1.7

Step 3

The data tabulated on the right calculates the deviations which equal to observed scores, O, minus expected frequencies, E.

(i. e. O – E)

-0.16	0.459	1.216	0.973	0.5944
0.784	1.491	1.906	-0.34	0.3684
-2.08	-0.27	-1.89	0.486	-1.703

Step 4

The data tabulated below calculates the sum of chi-squares which equals to the square of (observed scores minus expected frequencies) divided by expected frequencies. (i.e. $(O-E)^2/E$)

0.01	0.05	0.39	0.31	0.1
0.19	0.63	3.32	0.05	0.05
2.08	0.03	1.89	0.16	1.7

Sum of chi-square = Summation of the above tabulated data = 11

The overall measure of discrepancy is 11. The degree of freedom, d.f., = (no. of columns – 1) (no. of rows –1) = 8 and 11 is more than $x^2_{0.25}$ = 10.2 , thus Ho is rejected.

With reference to the group of data presented above. The result is that chi-square test establishes dependence of the punitiveness for legal violations on the awareness of social responsibilities.

CONCLUSION

If the enhancement of social responsibilities is achieved by means of learning behaviour, this change of behaviour is expected to be the result of delivering educational programmes. Evaluating educational packages by correlating scores in the mark sheets handed in right after group discussion is a valid method of determining whether the expected result is achieved. Accessing what effect the educational programmes have on students is useful and comments learnt at concluding discussion will be coupled with implementation of improvements.

APPENDIX (PP1)

Worksheet for Group Discussion (This is an English Translation)

Title: Occupational Safety & Health

Part I

Please read the following hazardous scenarios and judge what is the most appropriate deterrent action required:-

Scenario (a)

"Employ young people to clean dangerous parts of a machine"

Put a tick to the most appropriate deterrent action you think.

(5) ☐ Suspension of plant and Imprisonment of the In-charge
(4) ☐ Suspension of plant and Fine the In-charge
(3) ☐ Suspension of plant
(2) ☐ Fine the In-charge
(1) ☐ Demanding Improvement
(0) ☐ No action required

Scenario (b)

"Accumulation of a great deal of explosives and dangerous substance in the workplace"

Put a tick to the most appropriate deterrent action you think.

(5) ☐ Suspension of plant and Imprisonment of the In-charge
(4) ☐ Suspension of plant and Fine the In-charge
(4) ☐ Suspension of plant
(3) ☐ Fine the In-charge
(1) ☐ Demanding Improvement
(0) ☐ No action required

Scenario (c)

"Absence of any fencing for dangerous parts of a machine"

Put a tick to the most appropriate deterrent action you think.

(5) ☐ Suspension of plant and Imprisonment of the In-charge
(4) ☐ Suspension of plant and Fine the In-charge
(5) ☐ Suspension of plant
(4) ☐ Fine the In-charge
(1) ☐ Demanding Improvement
(0) ☐ No action required

APPENDIX (PP2)

Scenario (d)

"Absence of fire-fighting and first-aid equipment"

Put a tick to the most appropriate deterrent action you think.

(5) ☐ Suspension of plant and Imprisonment of the In-charge
(4) ☐ Suspension of plant and Fine the In-charge
(6) ☐ Suspension of plant
(5) ☐ Fine the In-charge
(1) ☐ Demanding Improvement
(0) ☐ No action required

Scenario (e)

"Gloomy lighting and insufficient ventilation in the workplace"

Put a tick to the most appropriate deterrent action you think.

(5) ☐ Suspension of plant and Imprisonment of the In-charge
(4) ☐ Suspension of plant and Fine the In-charge
(7) ☐ Suspension of plant
(6) ☐ Fine the In-charge
(1) ☐ Demanding Improvement
(0) ☐ No action required

Part II

Whom do your group think is responsible for keeping a safe system of work so as to reduce hazardous incidents?

You may tick one or more boxes.

☐ Government (surveillance and reporting to public officer)
☐ Employee (partner and colleague)
☐ Workplace in charge (employer, occupier, manager and supervisor)
☐ No one
☐ Others (specifically:______________________________)

APPENDIX (PP3)

Worksheet for Group Discussion (This is an English Translation)

Title: Equal Opportunity

Part I

Please rank the following discriminating scenario according to what you personally think is the most appropriate deterrent action required:-

Scenario (a)

"Purposefully speak indecent jokes"

Put a tick to the most appropriate deterrent action you think.

(5) ☐ Imprisonment of the perpetrator
(4) ☐ Fine the perpetrator
(3) ☐ Compensate the victim
(2) ☐ Make public apology to the victim
(1) ☐ Make private apology to the victim
(0) ☐ No action required

Scenario (b)

"Show insulting obscenity focusing on sexual figure"

Put a tick to the most appropriate deterrent action you think.

(5) ☐ Imprisonment of the perpetrator
(4) ☐ Fine the perpetrator
(3) ☐ Compensate the victim
(2) ☐ Make public apology to the victim
(1) ☐ Make private apology to the victim
(0) ☐ No action required

Scenario (c)

"Discomfort eyesight indicating sexual attempts"

Put a tick to the most appropriate deterrent action you think.

(5) ☐ Imprisonment of the perpetrator
(4) ☐ Fine the perpetrator
(3) ☐ Compensate the victim
(2) ☐ Make public apology to the victim
(1) ☐ Make private apology to the victim
(0) ☐ No action required

APPENDIX (PP4)

Scenario (d)

"Unwanted sexual touching or petting"

Put a tick to the most appropriate deterrent action you think.

(5) ☐ Imprisonment of the perpetrator
(4) ☐ Fine the perpetrator
(3) ☐ Compensate the victim
(2) ☐ Make public apology to the victim
(1) ☐ Make private apology to the victim
(0) ☐ No action required

Scenario (e)

"Indecent exposure"

Put a tick to the most appropriate deterrent action you think.

(5) ☐ Imprisonment of the perpetrator
(4) ☐ Fine the perpetrator
(3) ☐ Compensate the victim
(2) ☐ Make public apology to the victim
(1) ☐ Make private apology to the victim
(0) ☐ No action required

Part II

Whom do your group think is responsible for keeping a system of equal opportunity so as to reduce discrimination incidents?

You may tick one or more boxes.

☐ Government (surveillance and reporting to public officer)
☐ Employee (partner and colleague)
☐ Workplace in charge (employer, occupier, manager and supervisor)
☐ No one
☐ Others (specifically:____)

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INCREASING FEMALE PARTICIPATION IN TECHNOLOGY EDUCATION: A HONG KONG PERSPECTIVE

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Index: Technology Education, Gender, Equal Opportunity

Abstract: The educational and occupational opportunities afforded females and males in Hong Kong have generally not been the same. This disparity is built on history and tradition, an occurrence that exists in many other countries. Given the impact technology has on the lives of all individuals, it is imperative opportunities are provided to increase technology literacy, skills and attitudes of each and every one. This paper describes the past and current situation relating to technology education in Hong Kong. Descriptions of the steps being taken to increase female participation in the school subject, as well as initial results of such efforts are provided.

INTRODUCTION

As stated by Fu Xuan over 2000 years ago, *"How sad it is to be a woman! Nothing on earth is held so cheap"* (Waley, 1946). Even for a modern and progressive Asian society such as Hong Kong, some aspects of society's value of half its members still rings true today. Applied in the realm of education and the resulting employment opportunities education provides, girls in Hong Kong secondary schools have long been denied access to technical subjects and steered into traditional pursuits such as home economics and commercial subjects. Such practices have serious implications for a society that desires all members be technologically literate (Hong Kong Special Administrative Region Government, 1998).

For Hong Kong, government statistics suggest that women are not as involved as men in educational programs or occupations relating to technical subjects. As noted by Lee (1996), women and men are segregated in different occupations due to a "formidable combination of gender-socialization, education, and labour market mechanisms" (p.288). These "job ghettos" typically offer low pay, no security and little chance for advancement. Lee further commented that although educational opportunities have increased for women, "human capital theory", whereby people with people with equal educational credential *should* have the same amount of human capital, is not significant to explain the persistence of gender segregation and inequality in Hong Kong.

For instance, women are more likely to be found in clerical and unskilled work, while men are found in managerial, professional and technical work. Westwood, Mehrain, & Cheung's (1995) data on the subject revealed men were, on average, over six times more represented in the latter professional areas. Further evidence can also be provided. Although women make up 44 percent of the total working population, only 26 percent of the "data processing and tabulation services category were women" (Hong Kong Government, 1997). At the Hong Kong University of Science and Technology, only 4 of 80 professors in the computer science and electronic engineering departments are women, creating a shortage of role models for women (Scott, 1998).

A HISTORY OF TECHNOLOGY EDUCATION IN HONG KONG

Given the important role education has in shaping society, the history of technology (technical) education in Hong Kong has not been stellar in contributing to opportunity or equality. With a junior technical school opening in 1932 and soon afterwards a Junior Technical College offering the subjects of pattern making, technical drawing, furniture making, metalwork, and shoemaking it was not until the early 1950s, that *any* form of technical education was available for girls. This was a technical school providing secretarial and domestic subjects. During the 1960s to 1970s, Hong Kong's educational programs began to change. The number of schools increased, schools were re-aligned, and a common core of subject matter introduced. Prevocational schools were a new concept, providing basic technical skills to around five percent of the total junior secondary students. What can be observed today are the three secondary programs; grammar, technical, and pre-vocational, with only the former concentrating on those students preparing for further university studies.

In the early 1970s a White Paper (Hong Kong Education Department, 1974) recommended a new subject of Design and Technology (D&T) as a common core subject in general education. Conceived as a vehicle to introduce technology to students in the lower-secondary grades, the subject was to move beyond the craft-based approach of traditional woodworking and metal working. Sadly, enthusiasm soon waned as the traditional approaches continued. Furthermore, despite Education Department recommendations, D&T was never fully introduced in *all* schools and to *all* students. Today, much of D&T reflects a dated syllabus, inadequate facilities, poor public perception, lack of new D&T teachers being recruited, and inability to allow a wide-range of students to fully participate in the programme (Volk, Yeung, & Siu, 1997). As is described later in this paper, new initiatives and ideas about technology education are beginning to take hold, with the subject about to be transformed.

Regarding equal access and participation in the subject, not all schools offer D&T. And even in those schools which do offer D&T, currently only a handful allow girls. Gender bias in D&T is based on a combination of cultural and structural conditions. In schools with D&T, girls generally only take home economics, as D&T is not perceived as a female subject. School principals contribute to this discrimination by their insistence to schedule students' classes based on gender (Volk, Yeung, & Siu, 1997). In short, they find it much easier for arranging the timetable. Again, just as the subject of technology is about to change, so too is the access to it!

WHAT IS BEING DONE AT HKIED

At The Hong Kong Institute of Education, where over 4,000 students are preparing to be teachers, several initiatives to increase female participation in careers relating to technology have recently been introduced. With education seen as a necessary component for societal change, proactive steps are being taken in research, teacher preparation programmes and school curriculum. The following section provides examples of the work currently undertaken.

Pupils' Attitudes Toward Technology Study

The attitudes students have about technology, whether received though parents, peers, schooling, or one's daily life experience, plays an important role in their ability to actively participate in their current and future technological world. To examine whether there are differences in Hong Kong pupils' attitudes toward technology, an instrument was administered to nearly 3,500 Hong Kong secondary school students (Volk & Yip, 1998a). Data received were used to compare girls' and boys' attitudes toward technology and six attitude categories of: a) career options, b) schooling required, c) consequences of technology, d) interest in technology, e) technology as an activity for both boys and girls, and f) the perceived difficulty of technology.

The major results of the study on Hong Kong Pupils' Attitudes Toward Technology can be summarized as follows:

- For the demographic characteristics areas such as 'Gender', 'Will Choose a Technological Profession', and 'Have Taken D&T or Technical Subject in School', significant attitudinal differences were observed in all six attitude categories.
- Boys were found to have more-positive attitudes than girls for all attitude categories except that of 'Role Patterns'. In this category, girls had more positive attitudes than boys, indicating girls had more positive attitudes about their being able to participate in technology activities and careers.
- When both boys and girls have a 'Working Space at Home' or 'Have Taken D&T or Technical Subject in School', significant differences disappeared in several attitude categories.

Important to notice, was the effect of having 'Taken D&T or a Technical Subject' on students' attitudes toward technology being an activity for *both* boys and girls ('Role Pattern'). The gender difference was not significant when both boys and girls experienced this characteristic. In fact, the attitudes were exactly the same. What this suggests is the positive effect education, especially technical education, can play on forming *all* students' attitudes about technology.

One significant result of the study was that it acted as a catalyst for change in the program offerings in schools. With a summary report prepared, (Volk & Yip, 1998b) a copy was sent to the Equal Opportunities Commission (EOC), highlighting problems and concerns with the current practice, specifically relating to laws covering equal access to educational benefits, services and facilities. Soon the EOC examined the matter and did their own survey of practices in schools, asking principals about the subjects girls and boys were allowed to take. Not surprising, their findings mirrored Volk and Yip's, and thus began a strong push to expand school subjects. Notice was served to the Education Department that changes must occur, not only for D&T, but for Home Economics. Obvious concern and some resistance followed, with issues again centering around scheduling. In October 1999, a forum sponsored by the EOC was held at the Hong Kong Convention & Exhibition Centre to explain the required changes and discuss resource issues. It was a lively session, with many concerns raised. Nevertheless, the requirement for schools to change was not open for debate, leaving principals and teachers with a challenge to meet.

At the time of this writing, schools are slowly implementing the changes, some with mixed classes or gender-specific, while others are figured to comply in the near future. Programs have also slowly begun to change such features as the type of activities, materials used and tools/equipment. Teachers recognize the need for change and seem willing to try.

Changes in Teacher Preparation Programs

The Hong Kong Institute of Education is newly-established, combining the five former colleges of education that were located throughout Hong Kong. Prior to HKIEd's establishment in 1995, D&T and other technical teachers were prepared at the Hong Kong Technical Teachers' College. Most notable of the changes with the new Institute is the new Tai Po campus recently opened in 1997, north in the New Territories. This state-of-the-art campus houses all program areas and students formerly located in separate campuses.

As the new campus was originally planned by the Education Department before the Institute's current staff was recruited, maintaining the status quo was evident. This was demonstrated by the original plan to have the Design & Technology facility reflect a traditional skills-centered approach. In this way, the five workshops were to include woodworking, metalworking, plastics, electricity and drafting. So unimaginative was the planned D&T facility, the drafting room included only board drafting, as computers are not mentioned in the current D&T syllabus!

The establishment of HKIEd enabled a sizable number of new lecturing staff to be recruited in the department that prepared technical teachers. One major result of this change was a re-examination of program philosophy, courses and facility needs. Soon, it was agreed that the new facilities for preparing D&T teachers should now reflect a philosophy based on subject integration, rather than segregation; new technology, rather than old; an exploration of design and creativity, rather than a simple mastery of skills, and a concern about attracting students from non-traditional sources. For the latter, this naturally included women.

Some of the resulting facility changes include a 3-D studio, combining wood, plastics and metals; a system technology lab, introducing a variety of "modular" activities for all HKIEd students as well as school children; an electronics lab containing control technology and hydraulics/pneumatics; and a graphics lab with networked computers and a variety of software. A new entrance examination was also put in place, de-emphasizing hand skills and emphasizing creativity, problem-solving and action-based learning. The examination is also used as a "recruiting tool" to familiarize those students who did not have the opportunity to take D&T in schools. So successful has been this change in emphasis and recruitment, that not only have women just recently began to enter the program, but this year, for the first time a majority of the incoming class is female!

This 2000-2001 academic year welcomes the first cohort of Bachelor of Education students who will major in D&T. This new program is designed to replace the 2 or 3 year Certificate in Education program that is being fazed out, as the government will soon be requiring an all-degreed teaching force. This BEd in D&T is built on the success of the previously revised CE, and will no doubt lead the way in the new D&T programs for schools.

Expanded In-Service Programmes for Teachers

The major initiative being carried out by the Department of Information and Applied Technology in HKIEd for in-service teachers is the biannual Science & Technology Education Conference (STEC) held each spring. This two-day conference attracts over 500 teachers to workshops designed to expand their understanding of technology. As the key to increasing primary students' knowledge and attitudes, it is imperative their teachers are comfortable with the subject. For this reason, primary teachers are strongly urged to attend, for it is at the primary years that students' attitudes between begin to differentiate between gender (Zuzovsky, 1996).

STEC's have proven to be a success, providing teachers with hands-on experience in a number of areas. For instance, there were sessions on computer applications, lasers, robotics, and even hot-air balloons! Although some of the equipment necessary to repeat such activities in their own school is not available, it is hoped the experience received at STEC will translate into examples, stories and experience the teachers can use in their daily teaching. Especially for primary teachers, it is important their positive attitudes about technology are transferred to *all* their students!

NEW TECHNOLOGY EDUCATION CURRICULUM IN SCHOOLS

Fortunately, in Hong Kong's technology programs, some changes are beginning to occur. As a result of the *Review of Prevocational Education* (Curriculum Development Institute, 1997), a new course called Fundamentals of Technology will be required of all pre-vocational students to take.

The proposal recommends that *all* students (girls included) take this subject, a radical change from the gender-biased programs that are now the norm. The course will include a variety of technology activities and topics, and will replace the outdated metalworking subjects.

New syllabi, equipment and facility designs for the existing D&T programs are also soon to be implemented. This is particularly important for the lower secondary programs, which are extremely dated and of low esteem. For the new D&T programs, features such as the increased use of information technology, computer graphics, modeling, and the use of multiple materials are being proposed. It is expected that features such as problem-based learning, a reduction in skill development, and more problem-solving activities relating to technology will be hallmark features of the new program. It is also expected greater opportunities and attractiveness to study the subject will more naturally occur. This new D&T will be implemented in the 2000-2001 academic year.

Finally, more exciting and bold initiatives are being proposed for the *entire* Hong Kong educational system, not only for the curriculum, but for school arrangement (K-tertiary), admissions, and the way teachers are prepared A series of reports dealing with the *Education Blueprint for the 21st Century* are being released (see Education Commission, 1999/2000).. One important aspect relating to technology education is the recognition of the subject as being a Key Learning Area for *all* students in *all* grades, and in *all* schools. Although specifics are still to be debated through numerous consultation sessions, it is proposed the Technology Education KLA will among others:

- Offer real, relevant and purposeful learning experiences to enhance students' understanding and capability in response to the rapid changing technological society; and
- Enhance focus on technology by integrating or modularizing subjects such as Design Fundamentals and Technology Fundamentals.

No doubt, should these proposals be put in place, increased female participation in Technology Education and future careers relating to technology will naturally occur.

WHAT NEEDS TO BE DONE

One major area that still needs to be addressed is the way and manner technology education is taught or encouraged in *all* schools, not just in Hong Kong. As space precludes extensive discussion, the following are only suggestions, based on the author's work in the area:

- Classroom Dynamics: Basic point is that men and women (boys & girls) act differently in classroom situations. A teacher must recognize and encourage participation and questioning. Also, create a sense of "community" within the classroom.
- Reduce Competition: Low morale often results from a competitive environment. Use collaborative work, encourage pass/fail options.
- Consider Alternate Assessments: Give encouragement, and eliminate the grading curve.
- Fight Stereotypes: Obviously remove stereotypes to ability, careers, etc. No sexual references or jokes can be tolerated, even in all-male settings.
- Expand Outreach Programs: Programs such as the Technology Adventures Program, initiated by the author while at East Carolina University (Volk & Holsey, 1996), can be used to recruit females and/or provide role models for their future career options. TAP was a two-week summer program in high technology for secondary school girls. Each summer, around 40 girls would be exposed to hands-on activities conducted by female lecturers. Counseling was an integral part of the program, with the hope of increasing positive attitudes and motivation.

CONCLUSION

This paper has presented some of the important and relevant issues relating to increasing female participation in Hong Kong's technology education programs. No doubt, that given the tradition of education and stereotypes that exists in Hong Kong, there is much work left to be done. Hopefully through some of the initiatives outlined and proposals being made by the education bodies, more fruitful results will soon emerge!

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INTEGRATION OF GENERAL EDUCATION INTO THE VOCATIONAL TRAINING CURRICULUM

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Index: General education, seamless learning experience, curriculum integration

Abstract: As our economy is moving towards knowledge-based post-industrial era, graduates need to re-equip themselves to meet with rapidly changing expectations of employers and society. Vocational education institutions also need to provide a seamless learning experience to students and enhance their lifelong learning abilities. General education should form an integral part of the total education experience, instead of ad hoc extra-curricular activity. It should be well integrated into the existing vocational training curriculum. This paper discusses the arguments for such grounds and suggests how this can be implemented.

INTRODUCTION

Due to the structural change in the economy, nine years' basic education in Hong Kong is not sufficient to prepare for a smooth transition of the 16- to 19-year-old school leavers to employment. According to the experiences of many OECD countries, vocational training programs in the last two decades are unsuccessful to lower their high unemployment rates (see Lo, 2000). Hong Kong is currently experiencing difficulty in youth employment due to a similar structural change. In terms of unemployment rate, persons in the 15 – 19 age group were hardest hit, with a high unemployment rate of 27.6 per cent, against the overall rate of 6.1 per cent (Census and Statistics Department, 1999: FB8). However, at the same time, a large number of IT job vacancies are currently unfilled because of skill shortages. Structural change in the economy is believed to be the intrinsic cause of unemployment, especially after the Asian Financial Crisis (Chan, 1999). Markets are global by nature, and the Hong Kong SAR must move quickly if it is to take, and keep, its place at the forefront of the information age. Failure to do so will carry a heavy price in terms of growth and competitiveness.

CHALLENGES OF THE KNOWLEDGE ECONOMY

Hong Kong's economy is moving towards a "knowledge-based" post-industrial era, where workers are expected to be intellectual (see Ho, Denny 1999; Chung, 1999; Cheng, 2000) to survive in the E-cultural Revolution (see Kanter, 2000). Today's jobs will be relics of the past as traditional jobs "disappear". The present concept of work has its origin in the 18th and 19th centuries when growing companies and bureaucracies in the industrialized countries had to divide work in differentiated tasks to get things done. Due to globalization and increasing competition, work will take the form of tasks or projects which requires new technological skills as well as the 'skill' of finding and doing work in a world without clearcut and stable jobs, but emphasis in deregulation and flexibility, as new technologies can spring up tomorrow, making those of today obsolete overnight.

Employers nowadays emphasize the need for employees who have good personal and social skills, together with any technical 'know-how' which may be required. Employees are expected to be able to work in a rapidly changing environment, to engage in 'rule-making' rather than just 'rule-following' behavior, to work in project teams, to communicate well with colleagues, and to share the same 'personal chemistry' as others in the organization (see Brown & Scase, 1994). High school leavers are also expected to have general knowledge of work requirements and a good working attitude, but the present curriculum in Hong Kong only prepares pupils for academic studies and does not equip them with general skills and knowledge for work (Cheung & Lewis, 1998). Past researches further reveal that Hong Kong students are very pragmatic, instrumental and focusing on study-related matters rather than social life on campus (Kwan & Ng, 1999; Lai, 1999b; Pomfret & Lai, 1999a). Such discrepancies should be dealt with in the new millennium to respond to societal and employers' needs.

Mass education that was created for an industrial era is not satisfactory for the approaching information era, as the traditional educational systems have not kept pace with ongoing changes in societies in terms of new technology and the production of new information, as well as economic and social changes in a world rapidly experiencing global interdependence (see Parrott, 1998). The prevailing conception of knowledge as an external entity is breaking down. Knowledge is considered as internal and subjective, closely connected to the learner and the situational context. So, the existing bureaucratic system of administration is incapable of meeting the needs of the education system in the 21st century as traditional emphasis on acquiring information is being replaced by a focus on learning to learn and on the ability to use knowledge (Murphy, 1999).

As proposed in the recently published *Education Blueprint for the 21st Century* by the Hong Kong Education Commission (1999), it is clearly stated that "learning should be focused upon students' personal development and is not limited to school subjects or examination syllabus. Students should have a comprehensive learning experience through the formal, non-formal and informal modes." We must ensure that our students are fully equipped for the knowledge economy of the 21st Century by expanding their access to education and training. A fundamental overhaul of Hong Kong's education and vocational training system is needed to meet the community's changing needs (Commission on Strategic Development, 2000). Recognizing that vocational competence is no longer a sufficient quality to enable diploma and certificate graduates to meet the challenges posed by the millennium 2000, vocational training institutions must get away from traditional subjects and old method of rote learning that are not relevant in the information age. Besides, to attract and retain the best and the brightest talent to maintain a competitive edge, one of the main strategies of vocational education reform is to strengthen general education and to integrate it into the existing vocational training curriculum, instead of being antecedent to or concurrent with professional education (see Zlatic *et al.*, 2000).

As universally accepted, education benefits the individual in ways not only related to jobs or work but in ways that enhance self-discovery, self-fulfillment and the acquiring of knowledge, ways that enable one to be a responsible citizen at an international level. It is necessary to integrate socially-useful productive work with general education in the academic stream to equip all students with certain elementary skills. So, in addition to work skills, students must also develop diplomatic skills, an appreciation of differences (Sabo, 2000), recognize personal inadequacies through life-long learning and workplace re-training after graduation. General education, thus widens the students' scope of knowledge and develops a global sense. In fact, in a recent survey of graduates of the Hong Kong Institute of Vocational Education (Morrison Hill), quite a significant proportion (77.3%) of the respondents "strongly agree" or "agree" to incorporate broader training, such as leadership skills, knowledge of world-wide issues, interviewing and presentation skills, problem-solving techniques, etc. into the curriculum (Pomfret & Lai, 2000).

GENERAL VERSUS SPECIALIZED EDUCATION?

To achieve ever increasing excellence of performance and service that completely satisfy both internal and external customers by meeting their explicit and implicit expectations,[1] and to "provide a better physical and learning environment to attract able students foster their total development"[2] through improving and expanding student facilities and services to enrich campus life",[3] the restructured Hong Kong Institute of Vocational Institution (IVE) organizes general education in her nine campuses to enhance a balanced development of students' moral, intellectual, physical, social and aesthetic capacities in an ever-changing world. These programs aim at broadening students' horizons, widening knowledge of liberal arts, sciences and humanities, fostering their rational inquiry and independent thinking, and inculcating sense of personal and social responsibilities,[4] and providing them with an enriched perspective from which to examine and appraise personal, professional and social issues. The content of the programs includes civic awareness development, Chinese and Western culture, social participation, thinking methods, understanding of society, etc. through the use of open forums, workshops, group projects, visits, and community services. Students are encouraged to develop their talents in areas other than academic and professional fields. All first-year full-time students are expected to participate in a minimum of six sessions of general education as extra-curricular activities in order to satisfy the requirement to obtain certification, which is not a prerequisite for promotion or being recorded in the testimonials. For students who regard technical education just as an investment for better job opportunities instead of total education, existing policy gives no incentives for them to get involved in general education as extra-curricular activities. For the first year of implementation, only 25% of all first year students are awarded with the full certificate in the Morrison Hill campus. On the contrary, general education (or courses existing of similar nature) forms part of the curriculum and is a requirement for graduation in other tertiary education institutions in Hong Kong.

What role does general education play in the vocational education realm? Stereotypically, the "meat" of vocational education is the technical training which lies in the hands of the academics, who tend to students' cognitive and skills development, while student affairs personnel minister to the affective growth or the "soul" of the students (see Zeller, 1997: 10). As "managers" of the out-of-class experience rather than as educators, student affairs personnel pay attention to the so-called co-curriculum, student activities, affective or personal development or simply the "non-cognitive" part in the whole education of students. In the newly formed IVE, general education, being formalized as part of the student affairs realm, is expected to play supplementary, secondary or "para-education roles" to enrich the narrowly and increasingly specialized technical training curriculum by providing both a common core of knowledge and a breadth of knowledge and skills (see Kanter *et al.*, 1997: xxi-xxii; Papish, 1999). Is the present arrangement the best means to increase effectiveness with few resources? If we think that our traditional vocational training curriculum is too "narrow" for our students today, then the planners can simply widen the curriculum and incorporate broader training elements into the existing core modules?

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[1] Total Quality Management and Continuous Improvement (TQM & CI) concept as outlined in *Total Quality Improvement: A Quality Policy dedicated to all staff within the VTC (VTC Quality Policy)*

[2] Goal 3 of the seven main Goals which enable the VTC to implement its Mission

[3] one of the VTC Strategies to achieve Goal 3

[4] Please refer to Lai (1996, 1997, 1998, 1999a) for a detailed analysis of the development of civic education in colonial Hong Kong as well as the implications on student affairs services in tertiary education.

SEAMLESS LEARNING EXPERIENCE

The very notion of the definition of a good teacher has changed in the last decade by adopting or promoting a more holistic notion of what it means to teach well. Parker Palmer (1998: 11), one of the pioneers in this line of thought, views teaching within the context of building learning communities, that "the courage to teach is the courage to keep one's heart open in those very moments when the heart is asked to hold more than it is able so that the teacher and students and subject can be woven into the fabric of community that learning, and living, require". What Palmer emphasizes is the so-called seamless learning experience, and educators and administrators need to establish truly collaborative effort to analyze, strategize, and implement programs which require a unified effort to build learning communities (see Lamadrid, 1999).

A recent study of Papish (1999) further confirms the beliefs that academic and student affairs are polar opposites (Blake, 1996) or that there is little readiness for cooperation (Hintz & Stamatakos, 1978) are not supported. Student affairs professionals should advocate and facilitate seamless learning environments, featuring collaboration between academics and administrators for the benefit of students. In the Morrison Hill campus, collaboration has occurred via standing committees, counselling services, career planning and placement, students' financial aids and welfare, students' scholarship award and presentation, student activities, community functions, such as blood donation and most recently, in a survey of values of teaching staff.

The whole educational experience is becoming widely accepted, where academic and extra-curricular activities, campus facilities and social interactions all play an important part in a successful educational programme, leading to academic achievement and all round development (Pomfret & Lai, 1999b). Thus, general education, as part of the whole educational experience instead of just extra-curricular activities, should be integrated into and be part of the vocational training curriculum.

MODES AND STRATEGIES OF INTEGRATION

Inter-disciplinary teams can be formed so that collaborative efforts of integrating general education and professional abilities in the areas of critical thinking, time management, leadership, presentation skills, communication, project management, team work and meeting management skills, and ethical decision-making abilities within the contexts of different disciplines of studies and to give relevance and currency to course materials. Efforts to change general education concern the whole institution and inevitably entail disagreement about the content, structure, and philosophy of what should be done. Those involved in this change process should adopt an attitude of welcoming conflict and looking for ways to negotiate differences. Because academic departments have a good deal of autonomy in how they allocate their time on core modules for their students, integration of general education into an existing curriculum requires thorough discussion and mutual understanding, compromises as well as an open attitude towards a common goal of what should be taught to students. In fact, much of the content of general education requires interdisciplinary efforts to be successfully implemented. Coming up with a design is only the first step to change. The real work of general education takes place after a proposal has been accepted, when deciding on the details and making resources available are crucial. Some programs may require a joint effort of current teaching staff and the student affairs officers to implement them. Others may need a re-deployment of existing staff to conduct. When considering whether to deploy existing academic staff or involve solely the student affairs officers to conduct general education course or a joint effort of these two disciplines, respective departments concerned need to know how involvement will affect them. This is a crucial issue. The period of early implementation is an especially fragile time for changes. Departments that participate in it need to be encouraged and rewarded and staff teaching in general education courses should be evaluated and considered in tenure and promotion decisions (see Kanter *et al.*, 1997: 130). A thorough evaluation of the integration or changes should begin at implementation, before problems become insoluble and errors become institutionalized. Evaluation should be seen as part of an ongoing process of assessment and reform of general education.

CONCLUSION

Along with the growth of mass education, rapid expansion of university education before transfer of sovereignty, decline of manufacturing sector, along with the recent development of community colleges offering associate degree courses, vocational education suffers a surfeit of predictions, warnings, and labels. Institutions are expected to adapt to changes in the labor market and to respond to societal needs out of tight budgets and intensified competition for resources. Vocational training institutions, such as the nine campuses of the Hong Kong Institute of Vocational Education, should consider redesigning their curricula to meet a range of educational goals, from producing educated para-professionals who can function in the global economy, to addressing learning styles by adding teamwork and experiential activities to more traditional and structured lecture formats. At the same time, it is necessary to improve the quality of teaching and eliminate a culture of "low expectations" or an image of being a "no-choice substitute."

The continuous structural changes have increased the importance of up-to-date skills and competencies, calling for the development of effective strategies for lifelong learning. General education is providing students with a base for lifelong learning after graduation. The basis for employability is now broadening. Productive work habits, personal confidence, decision-making skills and a commitment to learning are becoming as important as specific vocational skills. To improve the employability of all students, most education and training systems are trying to reduce the traditional separation between vocational education and academic or general education (McKenzie & Wurzburg, 1997/1998). Since total and lifelong education is both an organizational goal and a global trend, general education should be regarded as an integrative part of this total educational experience.

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FLEXIBLE LEARNING: DEVELOPING OPPORTUNITIES

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Index: Flexible Delivery, Indigenous Australians, Culturally Sensitive Interactive Delivery, Access & Equity

Abstract: The delivery of training in a culturally sensitive, flexible manner is vital to achieve positive outcomes when training indigenous people. Within this paper I will examine many of the do's and don'ts when delivering culturally sensitive training. Case Studies will be presented where practitioners can work together and determine how delivery can be adapted to promote cultural sensitivity. From delivery to the outcome of flexible delivery. A range of outcomes from the Case Studies will be presented and evaluation techniques and evaluation instruments will be discussed at the reaction and learning level.

INTRODUCTION:

In summary this presentation will move from examining culturally sensitive flexible training methods to learning new evaluating strategies. Both will ensure that informed learning and positive outcomes take place.

> *Nothing remains forever what it was. Everything is on the move. Everything is transformed by nature and forced into new paths. One thing withered by time, decays and dwindles. Another emerges from ignominy, and waxes strong. So the nature of the world is altered by age.*
>
> Roman Poet, Lucretius (2000 years ago)

We are wise to observe these words and reflect on them for the purpose of education and training and with special reference to the delivery of vocational training in remote locations to Indigenous people.

Cultural sensitivity is arguably one of the most topical and controversial issues today. Culturally sensitive training is however a must when delivery training to Indigenous groups across any vocational skills area. Access and Equity principles state that people with cultural and linguistic backgrounds other than those of the dominant group, should be accommodated in the provision of training services.

In the delivery of training to remote indigenous communities there are many different issues that have to be resolved and considered. These include the distances needed to travel, the appropriateness of Courses and trainers, resources, interactive delivery methods and the ability to think intuitively.

Finally but importantly, culturally sensitive delivery.

Background Data:

Just under 3% of the population of Queensland are Aboriginal and Torres Strait Islander people, with a sizeable proportion of that population residing in remote areas of Queensland. Transport and other costs related to geographic remoteness add to the cost of food, housing, infrastructure and service delivery. Additional social issues, range from poor health, lack of adequate housing, school retention rates and so on.[i]

According to the 1996 Census, the rate of unemployment for Queensland's Indigenous population was approximately 23%, excluding indigenous people on special projects, it rises to 35%. Queenslands overall unemployment rate was 9%. Youth unemployment for the same period was 45%. In addition, only 18% of the State's indigenous population aged over 15 years had completed year 11 or 12.[ii] Therefore the lack of sustainable economic employment and business opportunities for indigenous people in the State, means that around 47% of Queensland's Indigenous population aged 15 years or over, had an annual income of $10, 000 or less.[iii]

Another grave area of concern is that there has been an enormous upturn in prisoners in Queensland. Some five years ago there were approximately 2300 prisoners in custodial centres. In starkest terms the prison population has more then doubled in a period of five years with 4780 prisoners in the custodial correction system and close to 21,000 in the community corrections system.[iv] A large 24% of these are Indigenous. What happens when these people are released? Well this will no doubt be the subject of another paper.

It is well recognised by the Queensland Government that improved education leads to higher levels of employment opportunities.[v] The main deficits that have been determined

are: high innumeracy rates,
poor spelling and comprehension rates,
high skills deficits, particularly in the areas of plant operators and trade skills

Scope of Training Delivery:

Our programs range from life skills to Management Training through employment related Vocational Education and Training to Traineeships and Apprenticeships to training program development, and delivery to overseas students. The majority of our work has a community focus, and it is not just about education, narrowly defined in quantifiable outcomes, but about the development of pathways and opportunities for indigenous people.

The scope of our registration is broad (28 Vocational Areas up to Advanced Diploma) this extensive range of Courses enables our clients to access a high variety of skills training across many competencies. Just as importantly is our philosophy that Education is for all, and we deliver Training "Anywhere, anytime." We currently deliver training from the remote isolated islands in Torres Strait down through the gulf communities, out to Mt. Isa across to Cairns and surrounding regions, then down the Coast, in Townsville, Mackay, Rockhampton, out to Emerald, Gympie, Toowoomba then throughout Brisbane and surrounds down to the Gold Coast and into N.S.W. (see attached Diagram 1-Map of Queensland). Now also to overseas students. We cover an area of some 1.8 million square kilometers in our scope of training delivery, currently.

Culturally Sensitive Training:

Lesley Wemyss Training Company has developed strategies and benchmarks in the delivery of culturally sensitive training, these are:

- Culturally appropriate language and setting for training.

- An understanding of the basic protocols for consultation, negotiation and participation with Indigenous.
- An appreciation of diversity within the Indigenous communities.
- And a manner respectful for the understanding of culture, people, history and land.

There are a number or do's and don'ts with regard to culturally sensitive delivery. Contained within the 'do' list are the following:

- Priority number one is to select the right trainer.
- Select the appropriate learning materials.
- Learning must be interactive.
- There should be two-way learning i.e. equal priority to European and Indigenous knowledge.
- Do not set-up individual competitiveness, it is not conducive to Indigenous learning.
- Provision of specific Literacy and Numeracy support where required.
- Sensitivity to family / tribal structure – family commitments and natural shyness.
- Awareness of the collaborative learning styles of indigenous.
- Consistency of training staff.
- Positive relationship development between learners, trainers and family.

Conversely there are a number of don'ts that need to be taken into consideration as well:

- Thoughts taken and expanded from the Torres Islander Academic, Dr Martin Nakata, that while being aware of cultural sensitivity is a good thing – it should *not* be at the expense of outcomes.
- While visual and oral modes are often the most successful modes for Indigenous learners, do *not* preclude the use of texts, in other words don't bypass texts if they are necessary for the outcome.
- While we know that Indigenous learn best by the collaborative process and don't like to be individually competitive, be careful that in following this learning style, that they will not cope with, or even access the individually competitive world of higher education or employment.

What Are the Major Ways Education for Indigenous People can be Effective:

- Establishment of effective arrangements for the participation of the community members/family members in decisions regarding training, delivery etc.
- Increase the number of Indigenous people as educators or engaged in the education process.
- To increase the opportunities for Indigenous people to be administrators.
- Choice (as to providers).
- That all remote schoolchildren have choice and access to education.
- Access for all Indigenous to further post-school education at home or away.
- To support the cultural needs of Aboriginal people within the education cycle.
- To provide community education and support to uphold their needs.
- To have 'sufficient' LLN skills for the goals that they wish to achieve.
- For all Indigenous students to have an appreciation of their history, culture and identity in the past, today and in the future.

- To ensure that all Australian students, especially the young, have an understanding of Aboriginal history, culture, identity and place in our history and our present.

"Perhaps the greatest dangers are those of arrogance, complacency and the ability to defend that arrogance and complacency. An acknowledgment of inadequacy is a prelude

to change. A defence of arrogance is a denial of any need to change." (Edward de Bono " I am right you are wrong")

What we always need to do as educators is think, re-think and be creative.

"We are locked into our institutions and structures as we are to our beliefs (about education, Indigenous etc.). The paradox is that as we move forward into the future there is more need for change then ever, yet there is less room for change because everything is

locked into positions." (Edward de Bono)

We are moving into a new millennium where we have not invented the jobs we need the training for in the next few years. How is it that we can't come to terms with being flexible in our delivery and tailoring it directly to the needs of the client?

We can go to the moon, but we can't predict tomorrow's weather – is this because we are better with static systems where the variable does not change? i.e. not what humans are!

In the following Case studies, we (as a Company) have outlined what we were presented with and how we managed the situations. (see attached)

I pose the following questions:

In Torres Strait:

- How would you initiate training and organise the first visit?
- How would you advertise the Course (Workplace Trainer)?
- Who would you send?
- How would you advertise the Traineeships system and organise this in the community for further training?

In a Mine in far North Queensland:

- What would be the first move to deliver the training?
- How would you turn around the negative training culture?
- What would be the first steps in planning the training for the Indigenous coming into the mine i.e. LLN needs, Skills needs and Career pathways.
- How do you ensure that training will be continually monitored and successful?

Now for the big picture – how does education work in the workplace – we will examine some specific examples.

Evaluating Training

As the training dollar is tied directly to outcomes i.e. work or further training, there has to be accountability. However it is sometimes rather contradictory to the outcome we, as trainers, are looking for, that is, skills or knowledge transfer and hopefully an attitude change.

'…It is also recognised that the problems (Australian) Indigenous face (in relation to outcomes) are exacerbated by their low skills, insufficient education and training and often long lengths of unemployment' (Prepared by Senate Employment, Workplace Relations, Small Business and Education Reference Committee, March 2000). So as a result often over training has to also deal with transference of skills, knowledge, self-esteem, confidence and job search skills. How does all this get measured and evaluated?

If we go back to the principles of Workplace Training then we can measure our success in skills and knowledge transfer and attitude change through using the techniques of maximum reaction and learning level for each participant.

Using the model of Staged Evaluation:

I'll do it ⇨ Demonstrate skills / knowledge

We'll all do it together ⇨ Set project

You do it yourself ⇨ Set project while you're away

Do it again for over learning ⇨ Track Participants

Training delivery should meet the appropriate outcomes of the local employment market and always be evaluated against these. Outcomes should be relevant to the community or remote situation in which the participants live. Training should benefit the whole community from which the participants come.

We try to adopt a two-way or both-way teaching methodology, which allow for the best of both cultures to be combined in the development of our training delivery.

In general evaluation strategies should meet the assessment guidelines of the training Unit, but as well incorporate the underpinning knowledge. However important in the evaluation process is the application of contingency skills and problem solving in other situations outside the original learning. This is where the stayed evaluation process is so important not only for reinforcement of the learning but the measurement of learning levels.

Our success in delivery is due to the application of these strategies, as well as our ability to be flexible in our delivery and evaluation methods.

Conclusion

We have achieved some great results with our vocational training delivery to remote Indigenous Australians, highlighted by two of the case studies presented. However, we recognise there is a long way to go, there are no easy or quick solutions, only a flexible and sensitive strategy is needed.

Let us say that training is akin to following a fenced path, with many twists and turns, in order to reach a predetermined goal at the end of it. With this in mind we ensure that the Vocational Education we offer to Indigenous people offers equity, cultural sensitivity, choice, support and diversity as well as opportunities which is a great deal more then simply education for Indigenous.

Indigenous people need to be in control of their own destinies and if we white people are to be a positive part of this then they must stop trying to manipulate and control and start to listen and learn. We need to be receptive to and appreciate the richness of Indigenous culture. We need to ensure skills transferred will be current and relevant to the job market. We need to think right outside the 'box' and train for today's and tomorrows skills.

If you find that these ideas have no value for you – give these ideas to someone who needs them as much as you do.

It is against this background that we deliver training in remote Queensland.

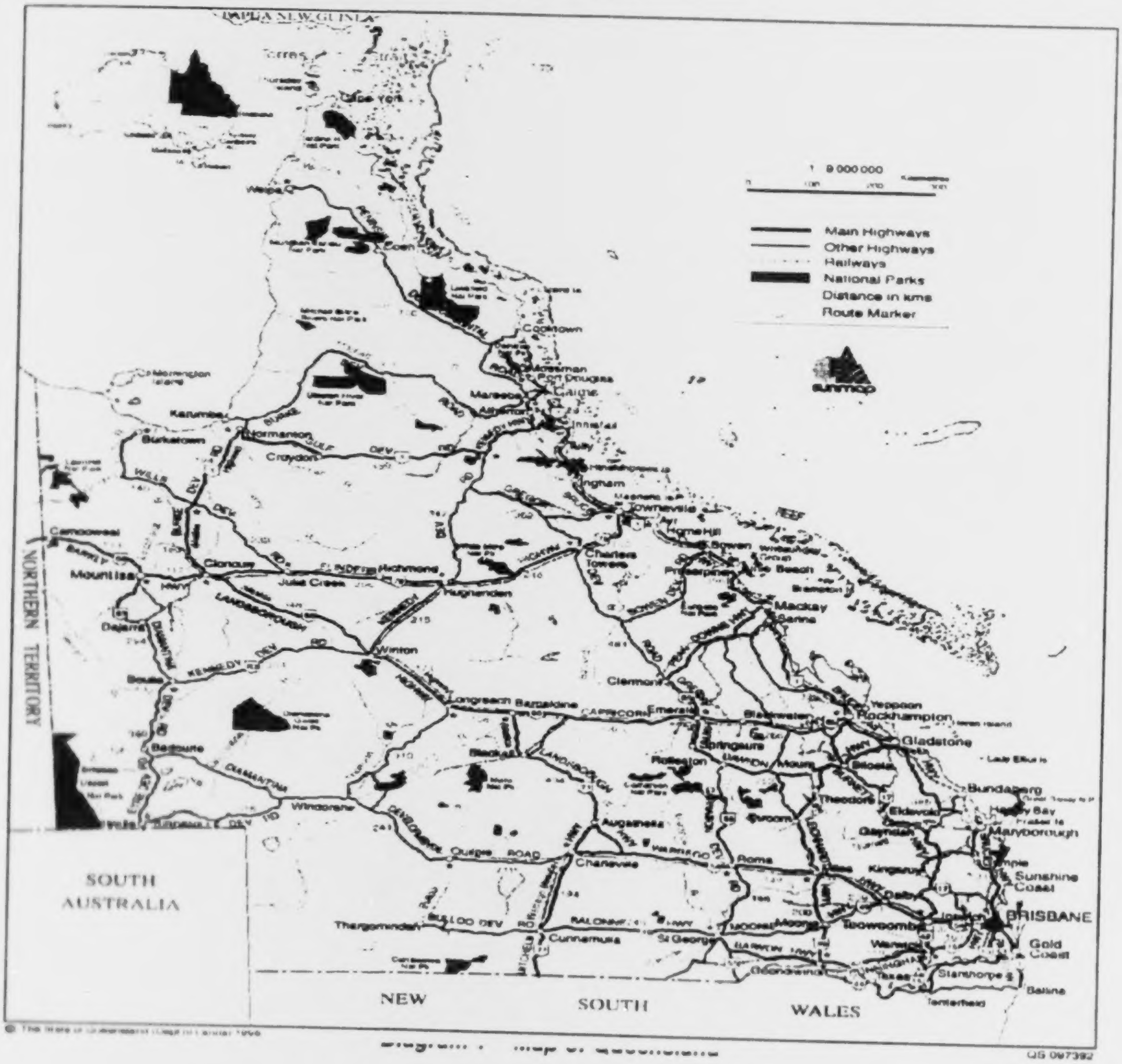
PAPUA NEW GUINEA
Torres
Cape York
Weipa
Coen
Cooktown
Mossman
Port Douglas
Cairns
Mareeba
Atherton
Innisfail
Mornington Island
Karumba
Normanton
Burketown
Croydon
Ingham
Townsville
Home Hill
Bowen
Proserpine
Airlie Beach
Mackay
Sarina
Charters Towers
Camooweal
Mount Isa
Cloncurry
Julia Creek
Richmond
Hughenden
Winton
Longreach
Barcaldine
Emerald
Clermont
Blackwater
Yeppoon
Rockhampton
Gladstone
Bundaberg
Hervey Bay
Maryborough
Gympie
Sunshine Coast
BRISBANE
Gold Coast
Boulia
Bedourie
Birdsville
Windorah
Quilpie
Charleville
Augathella
Roma
Dalby
Toowoomba
Warwick
Stanthorpe
Goondiwindi
St George
Cunnamulla
Thargomindah
Tenterfield
Ballina
NORTHERN TERRITORY
SOUTH AUSTRALIA
NEW SOUTH WALES
1 : 9 000 000
Main Highways
Other Highways
Railways
National Parks
Distance in kms
Route Marker
sunmap

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Diagram 1 Map of Queensland

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Setting: The Gulf of Queensland – the Pasminco Century Zinc Mine

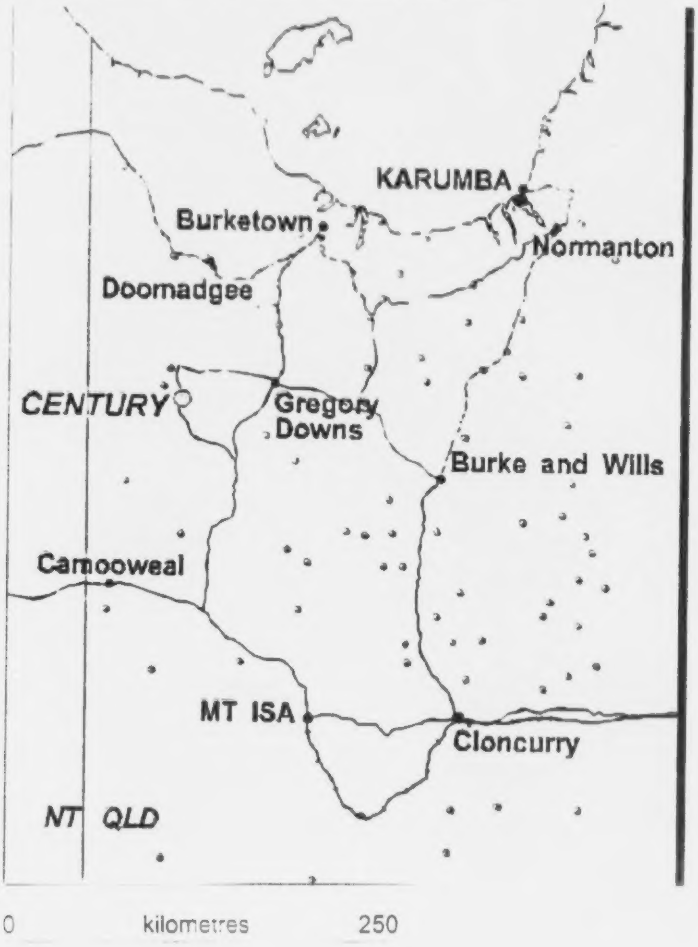
KARUMBA
Burketown
Normanton
Doomadgee
CENTURY
Gregory Downs
Burke and Wills
Camooweal
MT ISA
Cloncurry
NT
QLD
0
kilometres
250

Diagram 1 - Map of the Gulf Communities

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ROLE OF SUPPORTED SERVICES IN THE PROVISION OF VOCATIONALTRAINING FOR OPEN EMPLOYMENT TO PEOPLE WITH DISABILITIES IN HONG KONG

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Index Words: Vocational training / people with disabilities / job placement / work trials handicapped / supported service.

Abstract: The performance indicator for training for open employment is on how successfully the trainee is being employed in a job. Other than providing the job skills required which was always the emphasis in the vocational training, there are other issues, equally important, that should be addressed to prepare the trainees to enter into the competitive open job market. Independent and social skills should be strengthened through programmed activities. Attention should also be paid to minimize the mismatch between skills training and job opportunities to the trainees. Based on the provision in the skills centres for the people with disabilities aiming at training for open employment in Hong Kong, this paper identifies the areas and shares the experience of how the support service is rendered to enhance the employability of the trainees.

INTRODUCTION

Vocational rehabilitation of the people with disabilites is part of the continuous and co-ordinated process of their rehabilitation; which involves the provision of vocational services, such as *vocational guidance, vocational training and selective placement*. These enable them *to secure, retain and advance in suitable employment* and, thereby, to further *their integration into society*. To this end, *dedicated or special training* is provided to *increase their knowledge and skills* so that they are *better equipped to apply for a job in the open market*. Facilities for *re-training* are also provided so that people with a disability can *update their skills and knowledge* in line with modern *technology* (Rehabilitation Paper, 1995). Currently, there are about 150,000 disabled people in Hong Kong. They indeed represent *a strong workforce*. The *demand for vocational rehabilitation and training* in Hong Kong in 2000/2001 is projected as 1115, and met by five skills training centers, including Hong Chi Pinehill Village Advanced Training Centre and Caritas – Lo Mo Skills Centre (Rehabilitation Programme Plan, 1999).

Tuen Mun Skills Centre is operating under the auspices of the Vocational Training for the Disabled Section in the Vocational Training Council. Our goal is to provide effective services in the vocational training for the disabled aged over 15, and to equip them with *employable and remunerable vocational skills, as well as independent living and social skills* for their *subsequent open employment and integration into the society*.

THE VOCATIONAL TRAINING & REHABILITATION

The Structure

The Vocational Training Council provides vocational training programmes and support services for people with disabilities via its three Skills Centres, namely Tuen Mun, Kwun Tong and Pokfulam. They work for people with disabilities of the top calibre for their *vocational rehabilitation and training*, and providing them with a range of comprehensive multidisciplinary professional services, enabling them *to match their abilities and interests with the job requirements of the open employment market*. A total of 850 full-time training and 300 boarding places are offered.

The Disability Discrimination Ordinance (Cap. 487), the government *Rehabilitation Programme Plan and the Advisory Committee* (Rehabilitation Paper, 1999), reinforce the services and allow the people with disabilities to have an *equal opportunity* as their human right in *accessing to education, training and learning resources; together with a right to work, to earn a decent livelihood, gaining self-esteem, and serve the community* as an ordinary citizen of Hong Kong; *instead* of being *a social burden/expenditure. Promotion, marketing and public education* to motivate people with disability to seek employment, and employers to offer them jobs, are also promulgated, at the same time, by the Marketing Consultancy Office (Rehabilitation), government, non-governmental organizations and private sectors to the public.

Our *human resources management and strategies* encourage the services provision by the dedicated multidisciplinary professional staff, working under the learning paradigm and responsiveness to changes, with the *appropriate aptitude and culture to care and concern for the disabled intrinsically; developing, guiding, nurturing their vocational skills as well as facilitating their character built-up, personal and career growth* for *preparation to open employment* and *integration as an independent worker* in the society.

The Content of Vocational Training and Rehabilitation

Our Centre provides a comprehensive range of full-time, part-time evening, short and modular courses at operative and pre-craft level to match the interests, abilities, needs and aspiration of the trainees/ parents; and *gearing to the needs of the industries and trades in the employment market e.g. in servicing, printing and commercial sectors etc.* The operative level courses are for duration of two to three years, with one-year to two-year basis for the pre-craft level courses, whereas other short or modular courses may be ranging from one to six months. A *flexible instructional approach* developed by the *International Labour Organization*, known as the *"Modules of Employable Skills",* is practised in the Centre. This has been proved to be effective, in training the people with disabilities in developing their abilities and potentials, (through *breaking into essential learning elements and modular training units, of the employable skills profile of a job in industry or commerce),* and *enabling them to progress at their own pace.*

Boarding services, social and independent living skills training, and evening programmes, aiming *to develop trainees' self-care skills for daily living and integration in the mainstream* are run. Special function rooms, technical workshops and facilities are constructed to support the *vocational and social skills training*. These are conducted in the Centre by the teaching, instructional and boarding staff, vocational counsellors, social workers, occupational therapist, registered nurse. These are managed by administrative staff in appropriate balance between vocational and rehabilitation programmes, to optimize the development of trainees' abilities and potentials.

RANGE OF SUPPORTED SERVCIES FOR VOCATIONAL TRAINING AND OPEN EMPLOYMENT TO THE PEOPLE WITH DISABILITIES

Vocational Assessment Services

Before application to the Skills Centre, *all people with disabilities in Hong Kong* studying in the special education schools, or others, can *apply to be assessed by the Vocational Assessment Services Unit*, (which is also operated under the Vocational Training for the Disabled Section), usually before their graduation at secondary three. The Unit employs *international recognized test batteries* such as Valpar, Views etc. assessment kits *to evaluate the disabled persons' abilities, working aptitudes, interests, potentials and their various kinds of disabilities with specific identifications and recommendations*. Basing on their professional reports (compiled by industrial psychologist, social worker, occupational therapist, medical practitioner, experienced workshop instructor and teaching staff etc.), *appropriate development and training plans are formulated* by the referring agencies (e.g. school and rehabilitation social workers and placement officers) for their clients' future *appropriate placements and development*, e.g. be they suitable after training in Skills Centre for open employment, other supported employments, sheltered workshops, or day activity centers, etc. Through the assessment, sheltered workers or day activity centre clients etc., who have *upgraded their productivity* can also be *identified and offered appropriate training* in skills centers.

Vocational Training

Training of vocational skills in accordance with the *"Modules of Employable Skills"* are practised in our 18 *specially designed industrial and commercial simulated* workshops, to *minimize* trainees' *transfer of learning difficulties* encountered in the change of environment at work after their graduation. Supplemented with vocational skills training, communication, language, numeracy, computing, theoretical, industrial and commercial knowledge, techniques, skills training and physical education etc. are also taught in classrooms, function rooms, gymnasium and hall, as comprehensive education and training packages in 12 different trades. To enrich their training, trainees are arranged to participate in relevant industrial and trade visits, exhibitions and work trial schemes and extra-curricular activities etc. to *broaden their exposure and knowledge*. Internal job orders are also completed between sections and workshops, for pre-work training and real practices to *enhance their work skills, co-operative attitude, behaviour, group work and team spirit*.

Vocational Counselling Services

Our vocational counsellors are rendering vocational counselling guidance and advice to the disabled applicants, primarily *starting from their application*, and *throughout their stay in Skills Centre*, for their vocational training until their open employment after graduation. Basing on their *expertise, experiences, recommendation of the vocational assessment reports, abilities, interests/aspiration of trainees/parents*, selection of the courses are made. In collaboration with other staff of the work team (e.g. social workers, occupational therapist, training staff, centre managers), we work *to combat their vocational training problems and employment obstacles e.g. negative attitude and perception of the public and the employers, unfair terms of employment, higher work-related costs* (R. Heron & B. Murray, 1997), their work includes:

i) selection and development of appropriate *career plan*;

ii) individual as well as group *counselling* of vocational *training and learning problems*;

iii) group counselling on *job hunting and employment skills*, including co-workers' and line supervisor's relationships, working habits, behaviours, punctuality, diligence etc.;

iv) assisting trainees to find appropriate jobs *matching* their abilities and qualifications;

v) finding, *exploring and persuading employers to offer placements* to the disabled emphasizing the *benefits of their employments* e.g. their loyalty, diligence, cost-effectiveness, satisfactory performance etc. Employaid Fund is available for equipment or workshop adaptation requirements. (Better still, in Europe, wage subsidies, tax concessions, workplace adaptation grants or preferential treatments may be available (R. Heron & B. Murray, 1997));

vi) *accompanying* trainees for *interviews* with potential employers;

vii) assisting employers to make *workplace or workstation adaptation* (by Technical Aids & Resource Centre) if necessary;

viii) preparing them for *work trial schemes* for acquisition of working experiences and skills;

ix) *pre-employment work schemes* (a testing period both for trainees' and employers' mutual acceptance);

x) *supported employment follow-up visits*, (sometimes with teaching or other professional staff), to assist both the trainees and the employers for mutual adjustment and adaptation, whereby if retraining of trainees' skills/ attitude or workplace adjustment are necessary;

xi) *reflecting the market trend and changes* to management for constant review, and updating of training courses run;

xii) *feeding of data and latest development for new courses* to be mounted, in coordination with management, training staff and section heads.

xiii) *furthering studies in mainstream institutions*, inspectors of Vocational Training for the Disabled Section collaborates with our training/teaching and professional staff and *follow-up visits, advices on special teaching methods and arrangements* are made.

A *case* that a graduated trainee successfully completes vocational training and holds remunerable employment is attached in the Appendix I.

Independent Living & Social Skills Training in Boarding Section

Our Boarding Section is to *complement vocational training and reinforce trainees' independent living and social skills for their future working roles in the community. Basic and systematic daily living skills* are trained e.g. in cooking, in shopping and preparing food, table manners, cleaning of dormitories, proper self-care, personal hygiene, washing and drying of clothes; concept in use of money, time, and taking transportation, etc.

Social and interpersonal skills training are also provided to trainees for their integration with the mainstream in society, by running *evening programmes* and guiding more *interpersonal issues* e.g. more interaction among boarders and between houseparents for problem-solving skills and attending to instructions; by emotional disposition training group, drama training group, knowing and utilizing the community facilities outings, volunteer social work training group, stamp collection group, folk dance class, sports competition, karaoke competition, bowling, horse riding, hiking etc. All these help to build up their *learning of the social norms and rules in life, self-growing concept, team spirit in competitions, exploring their work potentials, utilizing and managing their leisure time more healthily and constructively, and enriching their enjoyment of a balanced life* in the future.

Social Work Counselling Services

Very often, trainees may be *obstructed from vocational training* because of various reasons e.g. personal, psychological, psychiatric, physiological or disruptive family factors, necessitating assistance from our social workers in *alleviating their troubles, solving their problems, or at least mediating the detrimental effects to their mental or/and physical states.* Obstacles for their integration into the mainstream employment and society may not only due to their disability, but also need for appropriate adjustment and combat of their psychological, psychiatric or physiological state of mind and behaviours for normal working, social interaction and acceptance. Generally, *social skills training, self-awareness, confidence building, respect for self and other, sex education* (especially for the female trainees for self-protection from abuse or harassment from work or daily life), etc. are also taught.

To be effective in *re-engineering/ modifying our trainees' to proper behaviours and attitude*, our staff, as vocational rehabilitation workers, requires to have a comprehensive knowledge of different kinds of *disabilities*, their different *disposition, behaviours and characteristics.* Furthermore, they need to have *care, concern and enthusiasm for their work, professional training* in social/ counselling disciplines, *well experiences* in the field, *collaborative team work spirit, life-long learning attitude to respond to new changes, requirements, horizontal (inside-out) exposure learning, and experiences* with other vocational rehabilitation organizations, for *inspiration of new knowledge, techniques and skills,* in order *to devise unique methodologies and guidances for each individual trainees.* A *case* summary is appended for a successful modification of attitude and behaviour from one of our trainees in the Appendix II.

Occupational Therapy Services

Our Occupational Therapist *works closely in collaboration with other workers* e.g. vocational counsellors, social workers, teaching staff, registered nurse etc. in *devising occupational rehabilitation plans* for the mentally and physically handicapped trainees, bridging their capabilities with the work requirements. She also matches appropriate; vocational/ job training with individual trainees' interests and aspiration, their work adaptation and technical aids to enable them to acquire the work skills and sustain their employments. A *case* summary is appended for the reinforcement of a trainee's abilities for work in Appendix III.

Medical Services

Our registered nurse provides professional medical services to *look after or guide the daily medication* of certain trainees, handles *minor injuries or wound dressing* and also participate in training the *independent self-care, hygiene knowledge, techniques and practices.* She also assists in handling emergency cases and sending trainees to hospitals when necessary.

Administrative and Management Support

In order to prepare our trainees for open employment and achieve our organization goals and objectives, a *clear and correct direction setting* with appropriate, *efficient and effective strategies and policies laid down. A design for a responsive, flexible and flatten structure of hierarchy* is established, to co-ordinate for speedy reaction to external and internal environmental changes, and to maintain and facilitate *functional efficiency in each subdivision. Resources* are sought to support our operation and improvement in the provision of quality services and training. We also have to *maintain an efficient administrative and clerical support* to all functions of training and rehabilitation work in the Centres.

Other Complementary and Subsidiary Activities

Centres also plan and schedule many different kinds of *extra-curricular activities gearing to enhance and reinforce trainees' social, interpersonal, and independent skills. Aiming to guide trainees' proper character built-up, nurturing their personal developments, team-work spirit, integration skills with people* (co-workers, employers, supervisors, friends etc.) are trained. Their *aspiration and development of interests* are also built for living normally *in the mainstream society* and leading subsequent healthy and successful working lives.

Technical Aids and Resource Centre

The Centre is one of the support services to the vocational training for people with disabilities in Hong Kong, which assists in the *design and production of employment, training required technical aids and learning resources*, to meet the particular needs of individual disabled workers in employment or during training.

CONCLUSION

Recently other rehabilitation agencies and Funds are also established to provide vocational rehabilitation programmes and services e.g. the Employees' Retraining Board, the Selective Placement Division of the Labour Department, supported employment services, on-the-job training services and tailor-made courses, funds granted to the self-employed disabled by the Employaid Fund, the Royal Hong Kong Jockey Club and the Queen Elizabeth Foundation for the Mentally Handicapped, the Government and non-government organizations etc.

The competition we face is fierce. This challenges us to continuously provide quality services in the vocational training for people with disabilities in the region. Our vocational training programmes will have to be regularly reviewed and revised to deal with the continuous shift of Hong Kong's economic structure from a manufacturing centre to a tertiary services provider (Rehabilitation Paper, 1995). We shall work towards the benefits, vocational training and rehabilitation of the disabled trainees, enabling them *to work in the open market and securing remunerable employments*; *meeting our organization mission and objectives* (Smith, 1990 p.4) as targeted.

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APPENDIX I. Case from Vocational Counsellor

P.L., suffered from hearing impairment and studied in our Commercial Class. Client's communication skill was average, but lacked self-confidence. During training period, she was arranged to attend a work trial scheme in a solicitor's firm for a month. The solicitor found her working attitude and habits were good, but she was too timid and anxious.

After graduation, the solicitor was persuaded to employ P.L. The solicitor gave her a chance. During the probation period, client got adjustment problems as she could not hear clearly. There was some misunderstanding among her colleagues. As client was too reserved, she was only willing to disclose her worries and difficulties to her mother for the first month. Our Vocational Counsellor made frequent phone contacts with the mother to find out client's problems. Frequent follow-up visits were also made in her workplace to render counselling to client, and to discuss and solve her adjustment problems. Finally, client was settling down quite well in her workplace. She mixed well with her colleaques, and the employer was satisfied with her performance.

APPENDIX II. Case from Social Worker

H.K. was a mentally handicapped and encountered interpersonal relationship difficulties. During his training, he thought he fell in love with a female trainee who however refused him. He was so depressed that he cut his hands. The affair seriously affected his self-confidence and performance at workshop. H.K. was counselled to use correct way to ventilate his negative emotions and to use right way to accept rejection. Nevertheless, he thought he was useless, inferior, depressed and unhappy. He was assisted to build up an objective view of himself by identifying his own strengths, beside his weaknesses. He had made improvement during his training period and gradually, his self-confidence increased.

It was encouraging to see H.K. making a lot of improvement in building up problem-solving and interpersonal skills before graduation. Months ago, when he came back to visit us, we were very happy to learn that he could maintain his job, got along smoothly with others and enjoyed his work environment.

APPENDIX III. Case from Occupational Therapist

K.Y. was emotionally labile, walked with dragging gait due to weak lower limb muscles and resting tremor over both arms and legs. She was unwilling to speak and answered in very soft voice. Her diagnosis was not clearly stated whether her presenting problems of mutism, and disuse atrophy of hypothenar muscles were due to functional or psychological origins. When treatment started, she was prescribed with therapeutic activities to strengthen her lower limb functions. Communication cards were used to encourage her verbal practices. Counselling was provided constantly to soothe her emotions and to explore her hidden feelings (which caused her to become mute). Liaison was also made with social worker to work on her emotions and abnormal communication behaviours. Her mother was also interviewed to solicit her support in assisting client and information gathering.

During the course of treatment, we noted she showed progress on her hand functions with decreasing tremor and increasing fine motor coordination. She showed improvement in her walking manner and she was willing to greet Therapist with smile and words. She now answered questions in short sentences, emotionally more stable and sometimes even laughed at interesting topics as normal person.

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EXPLORATION OF THE ABORIGINAL VOCATIONAL TRAINING IMPLEMENTATION STRATAGEM FROM THE OUTLOOK OF THE "TRIBAL CLASSROOM"

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Index: Aborigines, Tribal Classroom, Vocational Training, Implementation Stratagem

Abstract: In recent years, the economic development and the changes in the industrial structures in Taiwan have caused the agriculture-based production structure to breakdown among the aboriginal people of Taiwan. Employment opportunities in the traditional tribal villages have declined sharply and a great numbers of people have moved out of the villages. Foreign laborers have also created a high rate of unemployment among the aboriginal people and has weakened and limited their ability to compete with others. Therefore, in order to increase Taiwan aborigines' employment competence and employment opportunities, this article will be based on the perspective of the "tribal classroom" to explore suitable approaches and methods to implement vocational training among the aborigines. It is hoped that through self-awareness among the aborigines and through employment demand that the vocational plan stressing cultural learning, livelihood work, and the tribal environment, accomplishing through by the setting up of the "tribal classroom". The plan will promote tribal culture and enterprises, increase enterprise development and employment opportunities, and create comfortable residential and the tribal villages.

PREFACE

Recent years, the rapid growing economic development and the changes in society, harm the former way of the aborigines' self-sufficient life. It caused the agriculture-based production structure to breakdown and the employment opportunities in traditional tribal villages to decline sharply. Therefore, a large number of aborigines moved to the cities and to industrial areas for work. Agriculture production resources declined dramatically. Besides, the policy of allowing foreign laborers, has created a high rate of unemployment among the aborigines, and has weakened and limited their ability to compete with others.

Facing this problem, the government designed several programs to encourage the aborigines to participate in vocational training and to provide the employment information. But the aborigines themselves lacked the desire to participate in vocational training. There were reasons: the aborigines didn't realize the special needs of their tribe, and the place and time of training didn't fit into the tribal life style.

We have a principle of respect for multi cultural development, therefore we must respect the aborigines as we promote occupational training, localization of the occupation training. There is need the localization in the occupational training of aborigines, local circumstances need to be considered and there is need to be flexibly. The area will be relatively small; nearby groups will come together at a convenient time for training (Hsieh, 1997). This article has for its goal— suitable training for the aborigines. It is hoped that the self-awareness on the part of the aborigines and the demands of employment will bring about a vocational plan fitting the character of the aborigines.

THE IMPLEMENTATION OF ABORIGINES' VOCATIONAL TRAINING PLAN

To help the aborigines to adapt to modern society and to get a job more easily, the government has encourage many efforts and promote several plans, it encourage vocational organizations and private groups to help. It has subsidized the training of aborigines. It has promoted aborigines to get positions. It has placed aborigines in employment situations. It has encouraged the private sector to hire aborigines. It has made plans for the employment of the aborigines, etc.

Mostly there were some characters within these cases as below:

1. Practical vocational training

There are 13 public vocational training organizations in Taiwan, with 160 kinds of activity. The main object is to enroll the junior high school students in a training program. There is stressing, study, career change, and special vocational training (Hong etc., 1997). Besides the public vocational training organization for the aborigines, there also entrust the governmental organizations, the civil groups, the enterprises, and the school units that operate special training, and offer opportunities and space for aborigines' vocational training. As an estimated total, there are 58 classrooms, and 1622 persons have joined the training program form. July 1999 till December 2000 (Job Training Bureau of Labor Commission, Executive Yuan, 1999).

2. Combine vocational education and training to provide opportunities for aborigines

18 vocational schools promote the vocational education of aborigines, and cooperate with the vocational training center, to place aborigines in jobs.

3. To provide preferential treatment for aborigines to join vocational training

To aborigines to join vocational training programs, during the training period, living expenses, and scholarships, are provided. Those who get the license of a senior specialist receive special financial rewards.

4. To provide preferential treatment for aborigines' placement

Those jobless aborigines who have the ability and the desire, a subsidy is granted— this provides for transportation, a temporary job, training, a business start-up. They also subsidize enterprise that hire aborigines and subsidize the placement brokers.

They are to strengthen the placement service for aborigines and vocational technical training. They are to set up a consulting committee for the placement and vocational training of aborigines. They are to print a handbook of the rights of aborigine people, are to help from labor cooperatives for aborigines (Job Training Bureau of Labor Commission, Executive Yuan, 1999). They are to strengthen the principle of equal opportunity for the vocational training of the aborigines and provide preferential treatment and special protection for aborigines. They will eliminate unfair practices through a secure placement system under the supervision of social welfare.

The results of promoting the vocational training of aborigines in recent years have been good. Undoubtedly prejudice still exists in Taiwan society. The problems the vocational training of aborigines are various and complicated. Those result from the political, economic and cultural situation on Taiwan. Chang (1999), Cheng (1998), and Hsieh (1997), pointed out the reasons why the aborigines are unwilling to enter programs of vocational training:

(1) they don't realize the importance of the vocational training;

(2) the training places were not suitable;

(3) the time required didn't fit their needs;

(4) they can not adapt to the training method;
(5) the kinds of vocation training didn't correspond to the needs of tribe;
(6) lack of the necessary qualification to enter the training program;
(7) lack of special classes geared to them;
(8) the training period is too long;
(9) they are not satisfied with the preferential service;
(10) they can't support their families during the training period;
(11) the lack of companies managed by aborigines that could be used for training.

THE MEANING OF "TRIBAL CLASSROOM"

During the past ten years, several new policies have been initiated for aborigines. One reason for this was the development of the "Aboriginal Movement". This movement stressed protection of aborigine culture and promotion of the aborigine language. This is promoted development among the aborigines and promoted changes in society through cooperation and dialogue (Lee, 2000).

The "Tribal Classroom" was part of the culture movement promoted by Tsur Goo-Liu of the Pai-wan Tribe. He thought the difficult situation of the aboriginal tribal development was caused by the lack of work that would support their livelihood. He through that cultural identity and awareness were necessary base for development. Through a culture renewal, the work ethic would be strengthen, through tribal organizations products would be sold locally a wider market. No longer would people have to leave from tribal environment for work. Even those who left for work might return (Tsur, 1998). There are the characteristics of the "Tribal Classroom":

1. Based on the situation of the tribal, educational programs that promotion work and enterprise would have their own special features.

2.Tribal development would need culture learning, enterprise to support livelihood and protection of the environment.

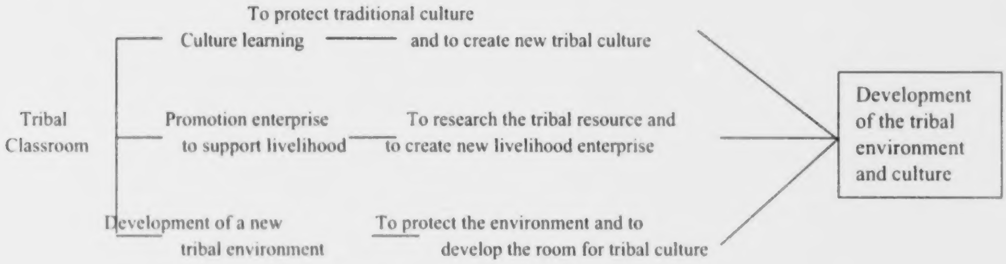
To protect traditional culture
Culture learning
and to create new tribal culture
Tribal Classroom
Promotion enterprise to support livelihood
To research the tribal resource and to create new livelihood enterprise
Development of a new tribal environment
To protect the environment and to develop the room for tribal culture
Development of the tribal environment and culture

Fig. 1 The significance of "Tribal Classroom"

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THE COMBINATION OF THE "TRIBAL CLASSROOM" AND VOCATIONAL TRAINING

1. The concept of the combined the "tribal classroom" and vocational training

The population of the tribal groups are not only relatively few vis-a-vis other groups. But their culture is also quite different from the majority of Taiwan society. In the acculturation process of the tribal groups in the wider society, they face the choices of protecting traditional culture or adapting to modern society. The aborigines must acquire the modern technical vocational training in order to survive in economic system of modern industry. However, modern vocational production activities may conflict with the traditional culture of the aborigines. Many people think there is need develop manufacturing techniques that conform to the character of aboriginal culture (Hsieh, 1997). Hence, through self-awareness of the aborigines and their employment needs, they can combine culture learning, livelihood enterprise, and the protection of the tribal environment by using tribal resources through the "tribal classroom". It is hoped that tribal culture and enterprises will be promote, that network learning will increase, that there will be industrial development and increased employment opportunities, that comfortable residential villages will be built. See Fig. 2.

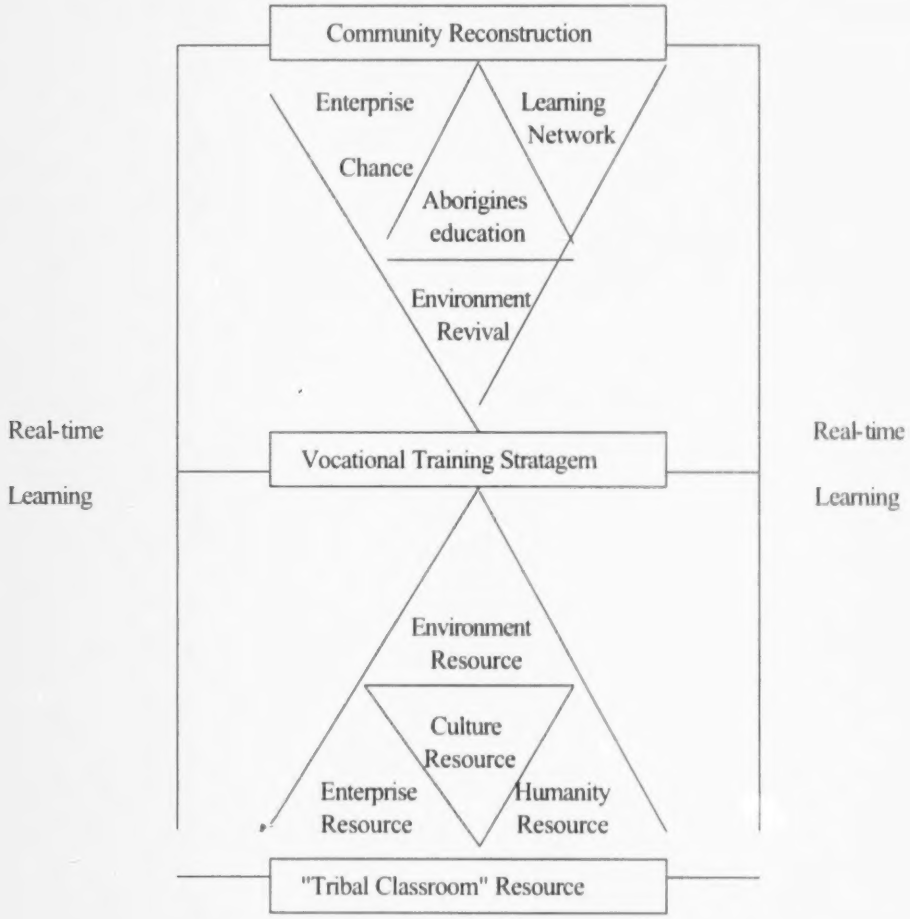
Community Reconstruction
Enterprise
Chance
Learning
Network
Aborigines
education
Environment
Revival
Real-time
Learning
Vocational Training Stratagem
Real-time
Learning
Environment
Resource
Culture
Resource
Enterprise
Resource
Humanity
Resource
"Tribal Classroom" Resource

Fig. 2 The concept of the combined the "tribal classroom" and vocational training

2. Implementation stratagem

(1) Searching and preserving tribal resource is the basis for vocational education and development training. Aboriginal culture assets are preserved in the tribal community. Searching and preserving tribal resource not only can reach the goal of preserving culture, but also have as a goal the spread of culture and the creation of a new cultural. Hence, tribal culture isn't a dead specimen or only a basis for business activity, but it's the modern civilization ready to face everyday life and changing world (Tan, 1998).

(2) Tribal villagers are to participate in making vocational training goals and in planning the courses. In the past, the aboriginal vocational training goals and courses were based on social development as a whole, but neglected the aborigines' special need for vocational training or did this in a confused manner. Through the plan of the "tribal classroom" tribal villagers can participate in public affairs and through aborigines' self-awareness, and understanding of the present crisis they can see the need for vocational training. They can participate in making vocational training goals and planning courses and programs for their own tribal villagers.

(3) Tribal vocational training and employment information centers are to be established. The tribal nature of the people has to be recognized. They can participate in activities locally and they will conform to their way of life. There will be improvement in the level of vocational information and training.

(4) Vocational education and training will promote the concept of learning throughout one's life and develop the tribal learning network. By raising the education and training are effective ways to develop the manpower resource of the aborigines. Vocational education and training play a care role in "tribal learning network", provide flexible learning style and multi-purposed learning methods, establishes and develops the vocational knowledge and the aborigines and improve their intellectual capacity for daily lives.

(5) In positively cultivates the talented aborigines who are expert at business management and sales, they will be leaders of the tribal livelihood industries. It promotes cooperation in buying and selling in the "tribal market". It will increase production and market competence of the tribal enterprises.

(6) It uses technical methods to create extra income. It also fosters a network to share learning experiences with the other tribal villagers, through this information, they can examine and foster tribal relationship and culture identity.

(7) It implements e tribal ecological preservation, environmental protection and the preservation of tribal villages, and reestablishes former tribal villages. By improves the tribal villagers' living standard and environment, it reinforces aborigines' self-respect and self-confidence, and promote the ability to adapt and the competence of tribal society.

CONCLUSION

Economic development at times brings negative social results. It brings more uncertainty to human life. Seeking a comfortable life and harmonious society are the natural desire and needs of all. People begin to think of their future. Now some urban people are beginning to move back to countryside, to their original hometown and birthplace. Capturing the original vitality of the community will make people feel that they belong to. That is to say, in this open society, we must recognize the need for the vitality of the tribal villagers and the need for the development of vocational training. By combining these two, there is an opportunity for new vitality in the life of the aborigine people — a vitality created by themselves belonging to themselves.

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PROFESSIONAL ETHICS – A LIFE-LONG PURSUIT BY AN ENGINEER

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Index: Professionalism, Ethics, Information Technology.

Abstract: After an engineering student has finished the studies in a college, he (or she) is prepared to, usually with much enthusiasm and high hopes, embark into a new world to make use of what he has learnt for the betterment of the society and the engineering profession. The pursuit of the "Real", the "Good", and the "Beautiful" has been the highest goal. With the dawning of the e-Commerce and "Dot-Com" era, with the IT (Information Technology) heat sweeping through the world and catching everyone by surprise, and with the rapid replacement of traditional materialistic substances by their electronic and cyber counterparts, we will witness a new economic order and have to adapt ourselves to changes in the engineering discipline. An important goal of continual and life-long education for an engineer is coping with changes around us while discharging various responsibilities required by the profession. This paper discusses, from the perspective of the IT profession and with reference to IT-related scenarios, the issues about professional ethics and the various expectation and requirements made on its members by a professional body.

INTRODUCTION

The engineering discipline has served mankind for a very long time. Starting from the ancient days, engineers were busy in conquering the nature to make a better living environment for their fellow humans. They removed the hills, leveled the grounds, built houses, roads, bridges, canals, tunnels. They made tools to ease jobs, made weapons to hunt and guard against wild animals. In modern times they build high rising buildings, machineries, automobiles, airplanes, telephones, computers, the Internet. With more inventions having been made, mankind would be able to enjoy an overall improvement in living standards. The roles of engineers have become so diversified that their contribution is to be found almost everywhere. A recent phenomenon is the "high-tech" wave whereby the Internet connects up large numbers of users and supports numerous applications. Computers are becoming more and more important and their usage has become more widespread. The "high-tech" wave brings about new challenges and new threats to the society, and in particular to the engineers in the information technology (IT) area. Faced with rapid changes in technology, IT engineers may experience conflicts of interest when performing their duties. How should he or she resolve the conflicts of interest arising from performing the job duties? What codes or guidelines can an engineer follow? This paper discusses the issues of professional ethics and investigate how a professional body can uphold the professional ethics standard among its members.

ENGINEERING PROFESSIONALISM

Together with the legal and the medical professions, engineering has been regarded a profession. What are then the qualities of a profession? According to [Fleddermann 1999], one of the qualities exemplified by a profession is that it requires high-level work that cannot be done in a routine manner by a layman without proper education background and subsequent training. It calls for judgment, experience, and sophisticated skills that can only be achieved with the appropriate education background and sufficient practical experience. Judging from this context, there is nothing wrong that a certain type of job is not a profession. It may that that the job nature is routine, or can be mastered in a short time by the average people without any specific education background. Nevertheless numerous jobs of this type are crucial to the normal functioning of the society. Fig. 1 shows, in a conceptual manner, how education background and experience combine to form the basis of a profession.

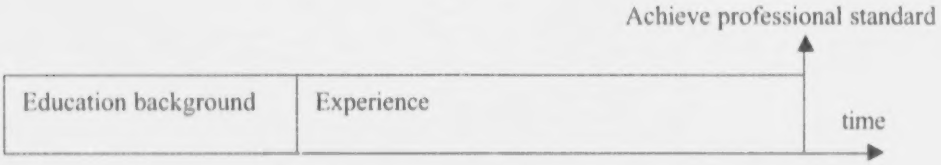

Fig.1 Profession quality

The practitioners of a profession (i.e. the professionals) never work alone. They need to join force in setting standards, and advancing the knowledge and technology, and in finding solutions to new problems. There is the need of a professional society (also called a professional body) for those who have met the education and experience requirements to join. An important function of the professional society is to uphold the professional standards required from its members. Standards are important in ensuring that the works performed are up to a certain acceptable quality. These are the yardsticks (pass or fail) against which the level of accomplishment is measured. Another function of the professional society is to spell out those things its members can do and those they cannot when practicing their profession. These are usually called the "Codes of Ethics" or the "Codes of Practice". These codes serve the function to guide members of the professional society on the right track. In case problems occur to their members, a professional society may provide assistance back up the members on the grounds of codes of ethics adopted by the society. A famous case in the discussion of engineering ethics is the BART case in 1975 where three engineers were fired by their company for "whistle blowing" – drawing the public attention to a potentially unsafe design of an automatic train control system. Since their actions were deemed to be compliant to the codes of ethics laid down by IEEE, the three engineers got the full support of the IEEE [BART 75]. To be a member of a professional society means that one's actions are governed by the codes of practice. In this way, professional membership is synonymous with high quality and is a label for the public to have confidence on.

The third quality of a profession is that it must do something *good*. On the surface, this requirement is obvious. But in practice it may be difficult to decide what is good and what is bad. To do so requires the application of moral standards, ethical standards, and materialistic standards. Hence this is the most ambiguous quality when it comes to actual practice and professional ethics has an important part to play here.

ETHICS AND MORAL

When we were young, we were always told by our parents to do this and that, and not to do this and that. Is there a set of rules that governs what we must do and what we must not? Some ethics theorists believe that we as human beings should have a set of basic rights. By nature we are allowed to do something. To respect others' rights, one has to refrain from doing something or one is bound to do something. This is the set of duties. Under the equality principle, rights and duties share a duality relationship. Because we have the rights of not to be disturbed, then must also have the duty of not disturbing others. Rights and duties can be defined for the engineering profession to govern what an engineer should do or should not do. When conflicts of interest occur, the engineer can apply the rights and duties principle to determine the necessary actions. The problem with the rights and duties principle is that there is not a universal set of rights and duties that everyone accepts. Sometimes it is difficult to decide whose rights should be respected more when conflicts occur. Another ethics theory is that we should do something which brings about the most benefit. This is a materialistic approach where benefit counts the most. The difficulty of applying this ethics theory is that it would be very difficult to calculate the amount of actual benefit in complicated situations involving the society, companies, individuals stretched over a large time scale. Something beneficial to a company may not be beneficial to the society, or long-term benefit may out-weigh short-term benefits.

PROFESSIONAL ETHICS IN IT

Due to the rapid penetration of our daily lives by the World-Wide-Web (WWW) technology that is fueled by the Internet, Information Technology (IT) has played a very important role in modern society. As an IT engineer, what would be the professional ethical problems that he would encounter?

A large number of professional ethical problems are related to the use of computer or the manipulation of data. A consequence of the popularity of the Internet and the WWW is the phenomenon that computers, and people as well, are "connected". It is only a matter of a simple click in the mouse to initiate data exchange between two computers. Documents residing in computers thousands of kilometers away can be downloaded in a matter of seconds. The protection of computer resources (hardware, software, data, and software) from unauthorized access becomes an eminent problem. It is not uncommon to see news reports on web sites being hacked – being accessed by unauthorized users. Sometimes no harm would have been done and only nuisance has been caused. But the other extreme is that millions of dollars in revenue is lost as a result of a distributed denial of service (DDOS) attack. The detrimental effects of computer-related crimes on the economy should not be taken lightly. As a IT professional, what are his/her responsibilities over these issues?

First of all, IP professional should have a set of codes of ethics to follow. To be qualified as IT professional, an IT engineer must join a professional society and then adhere to the codes of ethics. Secondly, IT professionals should apply their knowledge to design IT systems such that they provide services with high quality as far as costs, availability, robustness, response time, and security are concerned. They should employs techniques to ensure that information are exchanged in a secure and cost-effective manner across the Internet. Thirdly, the IT professional should provide education to the general public about the proper use of IT. There are many reported cases about youngsters playing the role of hackers. This is a consequence of poor education. Youngsters and grown-ups should be educated about the what can be done and what cannot.

As far as IT projects are concerned, IT professionals should note that IT projects change very rapidly. In every six months there will be some advancement in technology or product features. The IT Engineers should plan IT projects such that variations are allowed for. They should also define clearly the acceptance standard of work that cannot be measured merely in physical terms and quantities. Say, software standard and quality, system response time, and level of maintenance and supporting services etc. An IT professional should follow closely industry standards development. Due to the lack of precedents and case laws in the resolution of conflicts between contractors and engineers, as compared with traditional disciplines such as building, civil, mechanical, special attention should be paid to issues such as risk sharing among clients and contractors and unforeseeable disruption. The IT professional should ensure that the risks to be shared by contractors and employers are well balanced, open, and fair.

THE HONG KONG INSTITUTION OF ENGINEERS (HKIE)

The HKIE has laid down four Rules of Conducts as the cornerstone of conduct requirements of professional engineers. The first rule is about the responsibility of its members to the engineering profession. The second rule is about the responsibility of its members to their colleagues. The third rule is about the responsibility of its members to their employers or clients. The fourth rule is about the responsibility of its members to the Public. These comprehensive rules and the corresponding codes of practice prescribe the way an HKIE member should follow in order that the ethical requirements are satisfied. There is a Disciplinary Board in HKIE to take disciplinary actions against wrong doing committed by its members. The Disciplinary Board is composed of members from al the sixteen disciplines in HKIE, among them the Information Discipline is one of them. An example of drastic actions taken on a member removal of membership status and the removal of the member's name from the registration list of registered professional engineer.

PROMOTING PROFESSIONAL ETHICS

The Hong Kong Institution of Engineers (HKIE) and the Hong Kong Ethics Development Centre (HKEDC) have organized a seminar on "Professionalism and Ethics for Engineers" on 12th December 1998. There were 110 participants and favorable response towards this seminar was noted. In this seminar, there was a case study session in which participants were presented with hypothetical scenarios depicting ethical dilemmas that an engineer might possibly encounter at work. Participants showed great interest in the case discussions and most of them rated the group discussions useful and applicable in their daily work situations. The professional codes published by the HKIE is a handy reference and principle guidelines to its members. In addition to this code, it is felt that certain practical guidance on how to deal with possible ethical problems encountered in their workplace may also be beneficial to HKIE members. This publication, "Ethics in Practices - A Practical Guide for Professional Engineers" by the HKIE and the Hong Kong Ethics Development Centre of ICAC, therefore aims at providing professional engineers with a quick reference on some common ethical issues in their areas of work as well as proposing ways to handle such ethical dilemmas.

PROFESSIONAL ETHICS TO ALL MEMBERS?

The code of practice is applicable to all classes of members, from student, graduate, associate to coporate and fellow members. Any misconduct by HKIE members would be subject to disciplinary action.

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USE OF SOCIAL AND ECONOMIC MODELING TO PLAN VOCATIONAL EDUCATION AND TRAINING

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Index: Economic Development, Manpower Training, Human Resource Planning, Socio-Technical Issues

Abstract: The Workforce Education and Development program at Penn State University applies input-output and social accounting models to provide information for planning vocational education and training. These models are specified, and several applications of these models to training investment research are described.

INTRODUCTION

Integration of vocational education and training investments with modern social and economic needs requires advanced analytic tools. Reviewed in this paper are uses of analytic tools applied in planning research conducted through the Workforce Education and Development (WF ED) Program at Penn State University. The WF ED program has applied these tools to analyses of the employment outlook in various occupations as an input to training investment decisions.

MODEL

The WF ED program has applied input-output and social accounting models in its research on the implications of employment growth and change for the need for training investment. A hybrid input–output and social accounting model, called the *Pennsylvania REMI Economic Model*, was prepared by Regional Economic Models, Inc. (REMI) from Amherst, Massachusetts, for use in economic and demographic modeling and forecasting by the WF ED program. In 1992, the *International Regional Science Review* wrote that REMI models are one of the "extraordinary successes in the history of regional modeling" and represent the "state of the art in multiregional econometric modeling practice."

The *Pennsylvania REMI Economic Model* tracks the complex interindustry relationships that deliver industrial output for personal consumption expenditures, government demand for goods and services, fixed investments, and domestic and international exports. It documents the role that these factors play in supporting jobs and income throughout the economy.

In a single source, the *Model* provides information about the performance of the Pennsylvania economy as well as unique in formation about the relative competitiveness of the Pennsylvania economy with the rest of the United States in terms of prices, costs, productivity, and profitability in 53 industrial sectors. Also available is demographic information about 202 age/sex groups. Detailed information is provided about taxes by source, transfer payments by type, and employment in 628 occupations. Moreover, information is available about the status of small businesses in the Commonwealth.

The *Model* synthesizes information from many sources—to name a few: Bureau of Economic Analysis employment, wage, and personal income series, Bureau of Labor Statistics employment and wage data, and County Business Patterns data collected in conjunction with the Social Security program. The 1996 version of the Model contains historical data from 1969 through 1994 and allows forecasts from 1995 through 2035. Manipulation of several thousand *Model* variables allow simulation of the effects of policy, legislative, and natural changes on the Pennsylvania economy and demography.

Some WF ED applications of *the Pennsylvania REMI Economic Model* include studies of the: sensitivity of the economy of rural Pennsylvania to changing national defense expenditures; employment and income consequences of adopting California pollution standards in Pennsylvania; impact of vehicle emission testing; history and prospects for Pennsylvania manufacturing; economic outcomes of educational reform; economic impact of highway construction and use; structure of the Pennsylvania printing and publishing industry; effects of changing national health spending patterns on Pennsylvania health care and service employment; economic consequences of lowering teenage birth rates; effects of changing national infrastructure spending patterns on Pennsylvania construction employment; Pennsylvania impact of the 1994 baseball strike; and employment outlook for cosmetologists.

Shown in Figure 1 are the major paths of economic interrelationships endogenous to the *Pennsylvania REMI Economic Model.*

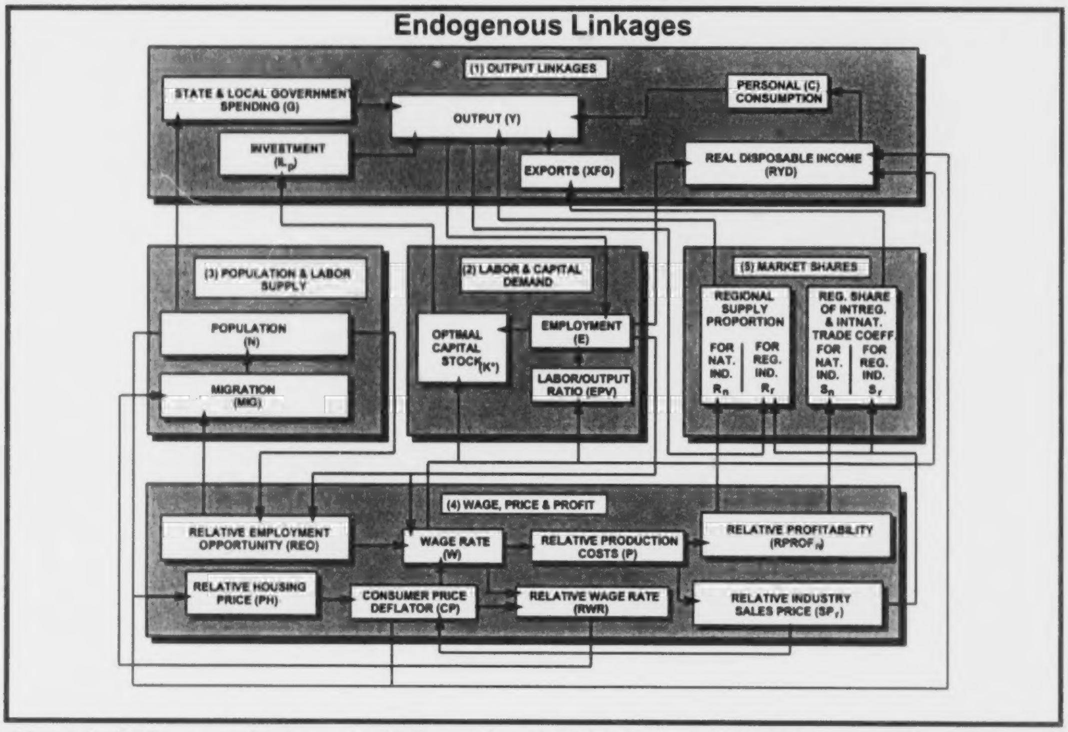
Endogenous Linkages
(1) OUTPUT LINKAGES
STATE & LOCAL GOVERNMENT SPENDING (G)
OUTPUT (Y)
PERSONAL (C) CONSUMPTION
INVESTMENT (I_p)
EXPORTS (XFG)
REAL DISPOSABLE INCOME (RYD)
(3) POPULATION & LABOR SUPPLY
POPULATION (N)
MIGRATION (MIG)
(2) LABOR & CAPITAL DEMAND
OPTIMAL CAPITAL STOCK (K*)
EMPLOYMENT (E)
LABOR/OUTPUT RATIO (EPV)
(5) MARKET SHARES
REGIONAL SUPPLY PROPORTION
FOR NAT. IND. Rn
FOR REG. IND. Rr
REG. SHARE OF INTREG. & INTNAT. TRADE COEFF.
FOR NAT. IND. Sn
FOR REG. IND. Sr
(4) WAGE, PRICE & PROFIT
RELATIVE EMPLOYMENT OPPORTUNITY (REO)
WAGE RATE (W)
RELATIVE PRODUCTION COSTS (P)
RELATIVE PROFITABILITY (RPROF_r)
RELATIVE HOUSING PRICE (PH)
CONSUMER PRICE DEFLATOR (CP)
RELATIVE WAGE RATE (RWR)
RELATIVE INDUSTRY SALES PRICE (SP_r)

Figure 1. *Endogenous Linkages in the* Pennsylvania REMI Economic Model *Among Economic Output, Labor & Capital Demand, Population & Labor Supply, Wages, Prices, & Profits, & Market Shares*

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This figure summarizes a large number of simultaneous equations that form the mathematics of the *Model*. The *Model* contains five sections of equations:

- The output section of the *Model* (Block 1) accounts for economic output that is created by personal consumption, government spending, and fixed investment in Pennsylvania and net exports from the Commonwealth.
- The labor and capital demand section (Block 2) models demand for nonresidential structures and equipment. Cobb–Douglas production function technologies are used to model substitution between capital and labor and to determine the amount of labor needed to deliver an unit of economic output (i.e., labor intensity). Employment requirements are calculated by multiplying labor intensity by economic output (Block 1).
- The population and labor supply section (Block 3) accounts for ways the effects of demography on the economy as well as the effects of the economy on demography. For instance, the size of the Pennsylvania population affects government spending because many government services (e.g., health, education, and safety) are delivered on a per capita basis. Moreover, the size of the population is affected by economic conditions in Pennsylvania. For instance, migration into and out of Pennsylvania is affected employment opportunities and wage rates relative to the rest of the United States. The *Model* contains detailed algorithms for forecasting births, deaths, and migration due to net immigration, migration of retirees and former military personnel, and economic migrants.
- The wage, price and profit section of the *Model* (Block 4) determines wage rates, prices for regional and national industries, and profits for national industries. Pennsylvania wages relative to the rest of the U.S. are a function of, among other factors, relative employment opportunities and consumer price changes. The *Model* calculates costs of fuel, labor, capital, and intermediate products relative to the rest of the United States. Some business taxes are modeled as capital costs to industries. Profitability is affected by costs and selling prices. Relative profitability of Pennsylvania industries affects regional, interregional, and international market shares held by the industries.
- The market shares section of the *Model* (Block 5) are divided into two types: regional market shares and export shares. Regional shares are the proportion of Pennsylvania demand fulfilled by Pennsylvania industries. Export shares include domestic and international exports and are affected mostly by changes in production costs. Because firms do not move to Pennsylvania instantly as a result of changes in costs, the *Model* contains empirically estimated lags between cost changes and increases in exports shares. Increases in regional shares substitute Pennsylvania products for imports. Export shares include domestic and international exports and are affected mostly by changes in production costs.

These five sections are calculated for all 49 industrial and four governmental sectors of the *Model*.

AN EXAMPLE

The *Pennsylvania REMI Economic Model* is the analytic tool applied in over 20 studies by the WF ED program at Penn State that have implications for planning vocational education and training. One example of these studies, a study of the employment outlook for cosmetologists, is summarized.

Cosmetologists deliver personal services meant to help people appear presentable and attractive according to cultural norms. In this study, we investigated the employment outlook for cosmetologists. First, we forecast employment and job openings for cosmetologists in Pennsylvania from 1995 through 2005 using the *Pennsylvania REMI Economic Model*. This aspect of our study helps to verify whether jobs are anticipated for cosmetologists. However, employment forecasts are conditional estimates of employment given a particular pattern of economic activity. It is useful to consider whether an employment forecast varies with variations in general economic activity. Therefore, the second purpose of this study is to estimate the sensitivity of Pennsylvania cosmetology employment to changes in consumer spending as well as changes in the business environment as reflected in taxes and costs.

Shown in Table 1 is a forecast of Pennsylvania cosmetology employment from 1995 through 2005. We forecast average annual employment growth of 544 cosmetologists over this period. Not all employment of cosmetologists is in the beauty shop industry. Some cosmetologists work in other industries, including health care (nursing homes, hospitals) and retail stores (beauty shops owned by stores).

Table 1. *Forecast Of Employment Of Cosmetologists In Pennsylvania, 1995-2005*

	1995	2000	2005	Annual Average Change
All Industries				
Workers	49,158	52,226	54,056	544
5-Year Change		3,068	1,830	
Beauty shops				
Workers	45,348	47,997	49,526	464
5-Year Change		2,649	1,529	
Other Industries				
Workers	3,810	4,229	4,530	80
5-Year Change		419	301	

Source: 1995 PA REMI 53 SectorEconomic/Demographic Forecasting and Simulation Model

Displayed in Table 2 is a forecast of job openings between 1995 and 2005 for cosmetologists due to employment growth and need to replace cosmetologists who die, retire, or otherwise leave the occupation. On an annual basis, approximately one of every five job openings for cosmetologists is anticipated to occur because of the need for replacement.

Table 2. *Job Openings for Cosmetologists in Pennsylvania, 1995-2005*

	Total	Annualized Average
Growth	4,898	544
+ Replacement	1,022	114
Job Openings	5,920	658

Source: 1995 PA REMI 53 SectorEconomic/Demographic Forecasting and Simulation Model

Table 3 contains deviations from the baseline forecast of cosmetology employment that are likely to result from changes in consumer spending and business taxes and costs.

Table 3. *Sensitivity Of Pennsylvania Employment In Cosmetology To Selected Economic Trends & Policy Changes, 1995-2005*

Trend Or Change	1995	2000	2005
	Forecast Without Policy Changes		
	49,158	52,226	54,056
	Difference from Baseline in Number of Workers		
Consumer Spending			
-1% In Total Consumer Spending	1,502	1,399	1,024
-1% In Other Services Spending	-1,149	-1,647	-2,293
- $10 MM In Personal Consumption	-1,884	-1,789	-1,443
Business Environment Taxes			
-1% In Total Business Taxes	2,026	1,937	1,591
-1% in Business Tax On Equipment	2,351	2,349	2,004
-1% in Business Tax On Property	2,696	2,730	2,381
Costs			
+1% In Investment Credit	-2,056	-1,981	-1,633
+1% In Total Production Cost	-981	-317	-339
+1% In Personal Service Production Cost	-1,871	-1,641	-1,235
+1% In Non-Wage Labor Cost For Personal Service Industry Only	-1,906	-1,696	-1,273
+1% In Non-Wage Labor Cost For All Industries	-1,616	-1,207	-671

Source: 1995 PA REMI 53 SectorEconomic/Demographic Forecasting and Simulation Model

As might be expected, decreases in consumer spending decrease cosmetology employment. One percent decreases in elements of this scenario are associated with between 2% to 4% reductions in cosmetology employment. Every reduction of $10 million dollars of personal consumption expenditures results in loss of between 3% and 4% of total cosmetology employment. One percent decreases in various business taxes increase employment by between 4% to 5%. On the other hand, a 1% increase in investment credits increases cosmetology employment between 3% to 4%. Increases in total as personal service industry production costs reduce cosmetology employment, as do increases in non-wage labor costs.

This study, then, demonstrates that approximately 650 annual openings were forecast for cosmetologists between 1995 and 2005. However, cosmetology employment is sensitive to a number of economic factors related to consumer spending as well as business taxes and costs. Caution and attention to economic factors are needed with decisions to enter cosmetology training, to provide cosmetology training, and to fund cosmetology training in Pennsylvania.

USES IN PLANNING

Occupational employment forecasts often are presented to policy–makers as single point estimates of the level of employment at some future date. However, all forecasts are conditional. Therefore, testing the sensitivity of forecasts to variations in their generating assumptions and conditions provides useful information about the risks and uncertainty embedded in using the single point estimates for planning purposes.

RETRAINING FOR THE UNEMPLOYED —
AN UP-HILL BATTLE THAT NEVER ENDS

S. S. Kwong, Executive Director
Employees Retraining Board
Hong Kong

Index: Unemployment, Retraining, Re-employment, Life-long Learning

Abstract: The Employees Retraining Board (ERB) has a mission to provide quality retraining courses and services to enhance the employability of the unemployed and potentially unemployed. Its main target groups include people aged 30 or above with lower secondary education and low skills. Through an extensive network of Training Bodies, ERB provides free full-time retraining courses for the unemployed and heavily subsidized part-time courses on basic skills for the target groups. Full-time courses are placement-tied. The ERB has achieved a remarkable placement rate of over 70%, as a result of strong supp ort from employers and trade associations, provision of quality multi-skilled training, and a comprehensive range of pre-training and post-training services. The ERB's long-term goal is to establish a competence-based Vocational Qualification Framework for Hong Kong.

BACKGROUND

Retraining of employees is extremely important both in times of economic downturn and prosperity, not only for the unemployed, but also for the potentially unemployed and those who need to up-keep their employability in the ever changing and competitive labour market.

The Hong Kong Government fully recognized the importance of retraining and established the Employees Retraining Board (ERB) as a statutory body in October 1992 under the Employees Retraining Ordinance. The ERB administers the Employees Retraining Scheme (ERS) and provide courses and services through a network of over 60 training bodies at 150 training centres throughout Hong Kong. Since its establishment, ERB has provided over 400,000 training places.

MISSION AND GOALS

In November 1998, ERB has reaffirmed its mission to provide quality retraining courses and services to enhance the employability of the unemployed and potentially unemployed to meet the needs of employers and the Hong Kong economy. It also has the goals of strengthening retrainees' learning ability and fostering a concept of life-long learning.

PRIMARY TARGETS AND TASKS

The ERB has the primary task of providing market-oriented and job specific training courses to equip the unemployed and potentially unemployed with the basic skills for re-employment. Its priority target groups are people aged 30 or above with no more than lower secondary education and low skill level. Such groups are most vulnerable in terms of employability and competitiveness in the labour market.

As many retrainees are the breadwinners in their families, ERB therefore offers short but highly focused full-time retraining courses for the unemployed to acquire the necessary skills for rejoining the labour force in the most cost-effective way. Full-time courses are free and for courses over one week or longer, retrainees will be paid a retraining allowance with no more than HK$4,000 a month to subsidize their travelling and meal expenses. The amount of retraining allowance is subject to review in order to avoid hampering retrainees' incentives to work while ensuring that it is adequate for them to continue with their training. The ERB also offers heavily subsidized part-time courses to help employees to upkeep their generic job skills such as basic computer application and basic vocational language skills so as to remain competitive in the labour market.

STRATEGIC PLAN AND NEW INITIATIVES

The ERB is a dynamic and market-driven organization. It constantly reviews its strategies to cope with changing labour market. In November 1998, ERB formulated a comprehensive strategic plan with new initiatives in six major areas, including: (i) Enhancing the quantity and quality of courses and services, (ii) Extend scope of services, (iii) Upkeep market intelligence, (iv) Strengthen partnership with employers and stakeholders, (v) Enhance cost effectiveness, and (vi) Foster positive corporate image. These new initiatives are summed up in Annex I.

New initiatives in the strategic plan have been implemented with remarkable progress. The achievements have been made possible with the involvement of ERB's working partners, including training bodies and employer / trade associations. For example, ten Course Steering Groups with representatives from training bodies have restructured and standardized major retraining courses in modular form, so as to improve their quality, pave way for common assessment and gain recognition by employers, course providers and stakeholders. At the same time, over ten Trade Advisory Groups with representatives from employers have been set up to seek their advice and feedback on courses and the latest labour market information. Such strategic partnership has not only enabled ERB to offer market-driven courses and services to meet the needs of its customers, but has also provided ERB with the latest labour market information to plan ahead to tackle future challenges.

CORE MODULES IN FULL-TIME COURSES

The ERB fully recognizes that in a rapidly changing economy, employees must be equipped with multi skills and knowledge in order to remain competitive and to meet the needs of employers. Multi-skills training has been included in all its full-time courses. Transferable skills such as soft skills, basic computer skill, vocational languages and occupational safety, health and environment have been incorporated as core modules besides essential modules on job-specific skills. To respond to employers' feedback, ERB courses pay special emphasis on soft skills such as work attitude, service culture, teamwork, communication skill, work commitment and job search skill. In addition, to keep in line with IT development, basic computer skill is also a must for full-time training to enhance retrainees' learning ability, access to information and application of computer skills in their jobs.

DIVERSIFICATION OF COURSES

The ERB has managed to modernize and professionalize traditional occupations such as domestic helpers, building attendants and hair stylists assistants, by introducing new elements of job specific skills and the four core modules. Such an approach opens up more job opportunities for the unemployed, particularly for those less educated and older ones.

To meet the need of a robust service and IT economy, ERB has developed and successfully piloted for full-scale implementation diversified market-driven courses such as IT Technical Assistants, Real Estate Agents, Life Insurance Agents and Building Service Craftsmen. All these courses have received favourable responses from both employers and the unemployed.

TAILOR-MADE COURSES

While ERB's courses turn out retrainees to meet the general needs of employers, it has placed heavy emphasis on developing Tailor-made Courses (TMC) to satisfy the specific needs of individual employers, groups of employers in certain trades, especially small and medium enterprises.

Tailor-made courses represent tripartite efforts of ERB, employers and training bodies in providing special training to the unemployed and in placing them into gainful employment with career prospects. Employers or trade associations involved in a TMC have to commit employment opportunities for the retrainees upon their satisfactory completion of the courses. Employers are heavily involved in the design and delivery of TMC. They also take part in recruitment of retrainees. They have to arrange site visits to let those who wish to apply for enrolment to have a better idea of the job nature and working environment before they make up their mind to apply for the course. Such arrangement should minimize subsequent dropout rates. Tailor-made courses have proven to be a great success with placement rate of over 80%.

PLACEMENT / FOLLOW-UP SERVICES

The ERB believes that it should not only provide retraining, but also follow-up services such as counseling and placement assistance to help the retrainees. All training bodies that offer full-time retraining courses have counseling and placement teams to help retrainees locate job opportunities and apply for jobs. Efforts of these placement and counseling teams, coupled with high quality market driven courses, have accounted for the high placement rate of over 70% for all retraining courses. To ensure that both employers and retrainees are satisfied with its services, ERB piloted a retention study in August/September 1999. 84% of the retrainees completed TMCs in January & February 1999 were found to have still remained employed and nearly half were still with the same employers. In future, retention surveys will be conducted for all tailor-made courses and regularly for all other full-time placement-tied courses.

To better serve its customers, ERB has set up a One-Stop-Service providing two service hotlines, one for employers to register job vacancies and another for the unemployed to enquire about courses.

RETRAINING RESOURCE CENTRES

Training and retraining is a continuous and life-long process for all. The ERB is convinced that life-long learning is especially important for the more vulnerable group of elderly workers with low education attainment and low skills. As ERB courses are normally of short duration, retrainee graduates may be helpless after placed into employment. The ERB has therefore set up Retraining Resource Centres (RRC) in various strategic locations of the territory to provide a comprehensive range of services, including pre-training and post-training counseling and follow-up services, latest market information, self-learning facilities and one-stop services for ERB retrainees, the unemployed and others in need of such services. The first two RRCs have been set up in December 1999 and March 2000 in Jordan and Lok Fu respectively. More RRCs will be set up in strategic locations throughout Hong Kong in the next few years.

THE WAY AHEAD

Retraining the unemployed, especially the more vulnerable group of elderly worker with low education and low skills to re-enter the labour market is an uphill battle. In times of economic downturn, the importance of retraining for re-employment is crystal clear. Yet even in times of prosperity, retraining is still indispensable for helping rectify the mismatch of the labour market and upkeep the employability and competitiveness of our labour force. This is particularly true in the era of rapid IT development in Hong Kong. As Hong Kong transforms into an IT and high-tech economy, the employment prospects for the more vulnerable groups appears gloomy. Without proper retraining, these workers will paradoxically be the victims of future economic prosperity. The ERB will therefore have a great challenge ahead to retrain these workers to acquire the necessary skills and knowledge to enhance their employability. These groups of workers who have been deprived of the opportunity to be benefited from the traditional education system should be provided with an alternative route for skill upgrading and career advancement.

VOCATIONAL QUALIFICATION FRAMEWORK

The long-term goal of ERB therefore is to establish a continuous and preventive training system to minimize unemployment and a competence-based Vocational Qualifications Framework for Hong Kong. The aim is to offer an alternative route to enhance the skills and life-long learning opportunities for employees who may not have the chance to benefit from the traditional education system. The ERB has been working with the Education and Manpower Bureau and the Vocational Training Council in formulating such a framework.

The ERB is not complacent with its achievements. It will strive for doing more and better to meet the needs of its customers and stakeholders – in particular employers and the unemployed. The ERB welcomes the opportunities to collaborate with employers, course providers, professional bodies, Government and all stakeholders to work for the betterment of our workforce and the Hong Kong economy in the new millenium.

Annex I

EMPLOYEES RETRAINING BOARD

MISSION

To provide quality retraining courses and services to the unemployed and potentially unemployed in order to enhance their employability and meet the needs of employers and the Hong Kong economy.

MAIN GOAL

To achieve total customer satisfaction of the unemployed, potentially unemployed, employers and stakeholders.

Strategies (Key elements: Market-driven, Value-added, Proactive, Flexible, TQM)

Initiatives and Workplan for 1998/2001 (those with * will require policy decision, the rest have been approved for implementation)

Enhance Quantity and Quality of Courses and Services

- Increase training capacity of TBs
- Buy training places from training providers
- * Review selection criteria of TBs and training centres
- Review evaluation system and performance indicators for TBs
- Seek recognition of ERB courses
- Include 'soft skills' training, IT and vocational language for each course
- Diversify types of courses and skills levels
- Provide more tailor-made courses
- Establish course steering groups and sectoral advisory committees
- Standardize similar courses of TBs and upgrade their quality
- Repackage training courses in modular forms
- Provide intensive follow-up and placement services to retrainees
- Enhance training of TB trainers and counter staff

Extend Scope of Services

- * Extend courses services to all unemployed, irrespective of age, education level etc.
- * Relax 70% placement target for all courses except tailor-made courses
- Strengthen pre-training counseling services
- Establish Resource Centres
- Extend opening hours of ERB enquiry counter
- Strengthen One-Stop Service
- Offer proactively ERB services to newly or potentially retrenched employees

Upkeep Market Intelligence

- Strengthen labour market analysis
- Collate and analyze existing labour market statistics and information
- Study manpower needs in specific industries
- Conduct researches to evaluate courses and services
- Network and obtain feedback from employers, TBs and all possible sources
- Share analyzed labour market information with other users

Strengthen Partnership with Employers & Stakeholders

- Maintain close liaison with employer/ professional associations by being their corporate members
- Include employer associations as TBs
- Set up sectoral advisory committees
- Establish regular forums with major employer associations
- Enhance communication and strategic partnership with TBs
- Maintain close co-operation with trade unions, community and welfare agencies
- Strengthen co-operation with government departments e.g. Labour, Social Welfare.

Enhance Cost Effectiveness

- Strengthen financial and auditing process of TBs
- Re-design budgeting cycle and unit costs
- Issue and update course administration and accounting manuals for TBs
- Computerize the provisions of courses and services
- Strengthen Executive Office's secretariat services
- Strengthen Executive Office's internal administration and financial management
- Strengthen staff training and development to enhance efficiency and productivity

Foster Positive Corporate Image

- Enhance corporate image
- Reposition ERB's role
- Increase ERB's transparency
- Set performance pledge
- Set guidelines for designing, equipping and packaging TBs' training centres with better image
- Liaise closely with mass media and interested parties
- Promote courses and services through publications, the press, electronic media, exhibitions and seminars

***Long-term Objectives**: Establish a continuous and preventive training system to minimize unemployment and a Vocational Qualification Framework for Hong Kong*

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MANPOWER PLANNING IN HONG KONG

Anthony Cheng
Vocational Training Council

Index: Manpower Requirement Approach (MRA), Labour Market Analysis (LMA)

Abstract:

1. VTC has been using the Manpower Requirement Approach (MRA) for projecting disaggregate sectoral employment by skill/occupational group. The whole exercise comprises isolated studies of the 25 economic sectors based on employers' perception of possible trends.
2. Labour Market Analysis (LMA) differs from MRA in terms of both focus and data requirements. LMA focuses on information from all players in the labour market, uses primary as well as other available secondary data, and analyzes data using also econometric models.
3. For consistency, the Task Force has conceptualized an LMA framework, outlined as:

Level One	*Aggregate Economic Level.*
Level Two	*Aggregate Labour Market Level.*
Level Three	*Disaggregate Labour Market Level.*

1. The planning of courses and training provisions must be related to future industry needs. However, the assessment of future manpower demand is not an easy task. Manpower projections inevitably involve the exercise of expert judgement based on available historical data.

2. The Vocational Training Council (VTC) has a rolling programme of manpower surveys. Since 1982, its respective Training Boards and General Committees (TBs/GCs) have been conducting industry-specific manpower surveys on a two or three-year cycle for some 25 economic sectors. The technical workforce covered by VTC's manpower surveys is about 2,055,000, i.e. about 80% of the total number of employed technical persons in all sectors. The four major sectors not covered are Medical, Social Welfare, Personal Services and Education.

3. VTC uses a computer program, called Adaptive Filtering Method (AFM), to project manpower for several possible scenarios. The program generates a series of curves and obtains optimum curve fitting by adjusting the value of a parameter A to alter the smoothing constant (1 - A). Basing on the series of curves and taking into consideration other socio-economical factors, TBs/GCs analyze and select the most probable manpower demand projection.

4. AFM is simple to apply and requires few data points. Its basic assumptions are: a high level of economic activities/employment, a continuation of technological advance, and the absence of war or other cataclysmic events. Advocates of AFM have argued that planners can take the various socio-economic factors into account during their selection of the most probable manpower growth/decline projections. Nevertheless, critics of its use contend that the use of only historical data for projection purpose has its limitations.

5. Guided by the projected manpower demand, course planners within VTC will submit proposed course plans to the respective Departmental Advisory Boards for IVE courses and to TBs/GCs for ITC courses. The consolidated course plan will finally go to the Council and then the Education and Manpower Bureau (EMB) for their policy decisions.

6. Throughout the various levels, there are constant inputs from experts in the respective economic sectors to ensure that approved course plan has taken into consideration other data and the overall economic situations plus social, technological and other changes; e.g. data collected by IVE/ITCs on planned places, enrolment figures, progression rates, placement rates etc.

7. The current manpower survey methodology by VTC is referred to as Manpower Requirement Approach (MRA) (Abegaz, 1994). Its three main steps are:

7.1 to project the demand for manpower,
7.2 to project the supply of manpower, and
7.3 to match demand with supply.

8. The economic and management consultants, Segal Quince Wicksteed (SQW), has commented that VTC's approach cannot be used to detect problems due to labour market restructuring and its effect on in-service workers. In the absence of an explicit model with determinants (independent variables) for supplementary analysis, SQW doubts whether manpower planners can actually consider the impact of the various socio-economic factors. SQW is however unconvinced that the extrapolations by any straightforward 'curve fitting' method can do so.

9. In October 1998, VTC set up a Task Force to explore the possibility of using Labour Market Analysis (LMA) in manpower planning. At about the same time, the EMB had commissioned a consultant firm to undertake a study of the best overseas practices with a view to finding out a manpower forecasting model best suited to Hong Kong. Among others, the firm has recommended in its draft report that VTC should focus on short-term industry-specific manpower projections.

10. Since inception, the VTC Task Force has reviewed the present manpower survey methodology, including survey design, questionnaire, and the dissemination of survey results. It has also studied in some detail three other 'curve fitting' methods: the ANN (Artificial Neural Network) Model, the multivariate models, and the ARIMA (Autoregressive Integrated Moving Average) applications.

11. After trial-runs using three sets of historical manpower data collected for three different economic sectors (viz. accountancy, sheet metal and IT), the Task Force concluded that the number of data sets available is too small to warrant any further test. The Task Force has however agreed that AFM is basically a special case of the ARIMA model. It is not as comprehensive as the other available statistical tools that are based on more well-developed statistical theories.

12. At present, VTC surveys are stand-alone. There are few common central assumptions with respect to VTC's other projects and government studies. For better coordination and consistency, the Task Force has conceptualized an LMA framework as follows:

Level One	*Aggregate Economic Level. Key economic/financial indicators that reflect the general health and stability of the economy and that may have an effect on the labour market in the long, medium and short terms*
Level Two	*Aggregate Labour Market Level. Structural factors of the labour market, including increase in labour force and economic structural changes, sectoral shift, cyclical unemployment, demographic structure and its effects in the long, medium and short terms.*
Level Three	*Disaggregate Labour Market Level. Industry-specific demand and supply analyses in the medium and short terms.*

13. The Framework reflects the interdependence of labour and economic performance, the cross-sectoral influence, and the supply- and demand-side determinants. Thus, it will provide the missing links between MRA, and quantitative econometric and manpower models.

14. Labour market behaves in many ways like other markets. Its supply side is the 'employees' and its demand side, the 'employers'. The 'product to be sold' is employees' service, and 'the price to be paid' is the salary and wage plus the terms and conditions of service. Other major players in the labour market include the government, employers' associations and trade unions.

15. Like other types of market, labour market is neither 'perfect' nor 'efficient'; but the speedy dissemination of information and mobility of people in terms of geographic and economic sectors can make the market more efficient. Labour market mechanism also obeys 'the law of demand and supply' and 'the law of diminishing returns' in the determination of prices.

16. LMA approach differs from MRA in terms of both focus and data requirements. It stresses that planning for education and skills development should be based on signals from the labour market. As regards focus, information comes **not only** from an amalgamation of employers' perceptions of possible trends, **but also** from other players in the labour market. As regards data, LMA requires, for its comparative analysis of survey findings, the collection of a wide range of data from published sources and earlier surveys, the broad and sectoral labour trends, and other available secondary data. As regards the types of data, LMA needs determinants such as those associated with labour market flexibility because these determinants affect participation and unemployment rates significantly.

17. LMA approach also entails a much stronger focus on the synthesis and interpretation of data in current and previous surveys, the actual patterns of demand in relation to survey forecasts, use of trend analysis and econometric models, wider consultation and discussion within industrial and commercial sectors before drawing any conclusions. It must be pointed out also that econometric models require regular maintenance. For example, the forecasting model based on the theory of the non-accelerating inflation rate of unemployment (NAIRU) in the USA is no longer valid in the sense that there is a change relationship; as is distinct from a relationship breakdown in the model.

18. Since the outcome of LMA includes employment and unemployment trends, sectoral breakdown of employment, future requirements and supply in terms of manpower, vacancy and skill, and the application of mathematical models; the LMA approach will enable VTC to plan more strategically. Planners can explore data, fit models, discover patterns, discover points that do not fit patterns, develop scenarios, assess key sensitivities, define and defend strategic priorities, monitor achievables against objectives, and feedback the learning outcomes into future planning cycles (SQW, 1996).

19. The complex US model by the Bureau of Labour Statistics (Lee, 1999) and Finnish 'Labour Force Model' by Dr. P. Tianen (1990) are based on LMA. Other developing economies are increasingly adopting LMA. In emerging economies, however, ILO's simple trend analysis model remains popular.

20. The Task Force will be implementing the LMA process through the acquisition of a **data warehouse**. This piece of equipment will provide a broad canvass of social, economic and labour market data/information for each of the major economic sectors. It is an information delivery system consisting of a blend of hardware, software, business knowledge, and systems integration skills. Typically, the data warehouse environment comprises three areas: primary manpower database; extraction and transformation of data from external data sources; and software tools for data analysis.

21. Data warehouse serves two useful purposes: analytical and decision support, and consolidation of data across many sources. Once set up, the warehouse will become the platform for all future data processing purposes: e.g. trend analysis, regression analysis, analysis using existing econometric or labour market models, and model building and evaluation. Suitable models for the local labour market can be explored and developed. The labour market information derived can also be rapidly disseminated.

22. In addition to the LMA framework and data warehouse, other improvement recommended by the Task Force includes: the reduction of all questionnaires to two types: standard and non-standard. The standard questionnaire will collect essential quantitative data such as the number of employees, vacancies, trainees, and salary range in the sector. The non-standard one refers to opinion survey questions and other qualitative questions specific to the economic sectors; e.g. demand for in-house and external training, the priority of training courses required by the respondent etc.

23. As regards dissemination, information on medium-term labour supply composition by age, skill levels, education and need for training or retraining will be included, with potential users' requirements in mind, e.g. employers, academics, human resources managers and government officials. Pictorial representation and coloured charts in addition to tables will be used as far as possible in all publications. In addition to press release, publication, reports, fax-on-demand, CD ROMs, and Internet, VTC will also disseminate its manpower survey findings using data warehousing technique in order that potential users can do their own analysis of the available data from different sources.

24. The Task Force realizes that LMA is only a very powerful tool for manpower planning purpose. It is not a panacea for all economic problems. LMA must be used with discretion and with an eye on the general direction of the latest economic developments and government economic, social and manpower policies.

25. From the manpower trends and in response to the latest social and economic developments, VTC will adopt the following measures:

(a) *to reform all craft courses to upgrade low skills to a higher skill level;*

(b) *to introduce more technician courses;*

(c) *to shift emphasis from manufacturing to services sectors;*

(d) *to strengthen in-service and up-grading training;*

(e) *to make training programmes more flexible;*

(f) *to introduce more specialized training in IT, banking, insurance, accountancy and also Chinese cuisine;*

(g) *introduce trade testing and certification system for more trades; and,*

(h) *introduce tailor-made course for those less academically inclined S5 school leavers.*

26. While VTC will endeavor to provide sufficient labour market information to all course planners; it can only accomplish its part at the vocational education and training level. There is the need for concerted efforts of the various players in the labour market to make things happen. For example, the HKSAR government is determined to be the catalyst for sustaining a highly efficient trading, marketing and financial services infrastructure. It has also in its budget allowed for substantial increase for training and retraining. Furthermore, in a report on the long-term economic development for the next thirty years, the government has laid down four major strategies, seven key industrial sectors and six challenges. In other words, the government has set very clear direction for the future manpower planning for HK.

27. The business sector must respond by spending more on research and development, invest in high technology, and start up new ventures to inject momentum to the local economic and create more employment opportunities as restructuring continues. As an example, the IT and other new technologies sectors have created 45 millions jobs in USA from 1970 to 1997.

28. Higher education and management association must enhance the skills of senior and middle management. There is also the need to focus on multi-skill, core training and re-training in order to enhance the mobility of the labour force across different economic sectors; and the need to strengthen job matching between training and vacancies. In addition, Hong Kong should perhaps seriously consider the introduction of a vocational qualification framework to give due recognition to vocational education and training and to boost labour flexibility has already been practised by several economic superpowers.

29. To conclude, manpower projections provide some useful clues to both economic and manpower planners as to what, when and how action must be taken in order to slow down, stop or oven reverse downward trends in manpower demand. If manpower projections can help planners to made the right decisions to sustain reasonable economic growth and high employment rate, then all the objectives of manpower planning are considered to have been achieved.

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IDENTIFYING AND RESPONDING TO SKILLS SHORTAGES

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Index: Planning Issues, Assessment and Recognition Systems, Trends and Impacts on Training

Abstract: Skills shortages limit economic growth. Tight labor markets in the United States have highlighted for policy–makers the problems that skills shortages create for the economy. Yet, it is difficult to document and respond to skills shortages. No single, direct measure identifies a skills shortage. Identification requires multiple economic indicators. When skills shortages are identified, prescription of responses to alleviate shortages is equally problematic. Selection of investment in training as one response requires that other factors affecting labor supply and price must be ruled out as contributing causes of shortages.

INTRODUCTION

An adequate supply of human capital is essential to the smooth functioning of any economy, especially as economies are becoming more skill-based than ever. The skills of workers contributed more than a quarter of all growth in labor productivity during the 1990s in the United States (U.S. Department of Labor, 1999). Investment in the creation and maintenance of human capital especially is important to sustain this growth.

Concern is evident, however, that the supply of human capital in the United States is inadequate to meet current and future needs. Labor markets are tight. Unemployment for the entire United States during 1999 was at its lowest rate in 28 years (U.S. Department of Labor, 1999), and the unemployment rate was below 4% in nearly one-half of the nation's metropolitan areas (Koropeckyj, 1999). The Board of Governors of the Federal Reserve Bank (1999), the central bank of the United States, noted that, "The demand for labor continues to outstrip the readily available supply of labor in most areas….tight labor markets remain the norm." Most regions of the United States reported widespread labor shortages during the third quarter of 1999, continuing a pattern observed over several years. Retail sales, manufacturing, and construction sectors of the economy have experienced the most difficulty filling job vacancies.

Training is often seen as one solution to skill shortages. Prerequisite to investment in training motivated to meet skill shortages is however, the validation that skill shortages, indeed, exist. And, if shortages are verified, then training is but one prescription for curing problems realized from shortages. In this paper, I review methodology for identifying skill shortages in labor markets. In brief, no single method is available for identifying skill shortages. Rather, evidence is needed from multiple points of view. Also, I discuss the variety of policy and program responses to skill shortages possible in addition to training investment. As with diagnosing the existence of skill shortages, prescribing solutions to shortages is difficult and uncertain.

IDENTIFICATION

According to Veneri (1999), "Shortages occur in a market economy when the demand for workers…is greater than the supply of workers who are qualified, available, and willing to do [a] job" (p. 15 at prevailing wages. No single data source exists to measure skill shortages. Rather, labor market data often are used to corroborate anecdotal reports from employers and other observers and analysts.

Blank and Stigler (1957) found three definitions in use for defining skills shortages:

1. In what Blank and Stigler (1957, p.23) described as the "social demand" definition, which determines that a shortage exists if the number of workers is less than the number needed. For example, a shortage of physicians would exist if the number of physicians per 100,000 people was less than the number that planners and other experts believe is needed to adequately treat the population.
2. Another definition offered by Blank and Stigler (1957, p. 23) indicated that a shortage exists if the quantity of labor that is demanded is greater than the quantity supplied at the prevailing wage. This definition takes a cross-sectional point of view tro define the shortage.
3. Still another definition provided by Blank and Stigler (1957, pp. 23–24) takes a longitudinal perspective. From this point of view, a shortage exists when the number of worker available increases less rapidly than the number of workers needed at the salaries paid in the recent past. Blank and Stigler (1957, p. 24) asserted that one consequence of a shortage defined in this way is that substitution of labor inputs will occur from one skill level to another. For instance, rising salaries might not increase the supply of registered nurses, but might stimulate the substitution of practical nurses or health care aides for more highly trained and credentialed registered nurses.

Arrow and Capron (1959) introduced the concept of a "dynamic shortage" (p. 301) to extend the Blank and Stigler definition by describing a labor market in which demand continually outpaces supply. Conditions for a dynamic shortage include rapid and continuing increase in demand for a skill set, low elasticity of supply (low responsiveness of supply to wage changes), and sluggish adjustment of wages to market signals. The last condition is a recognition of imperfections in information in labor markets.

Frank and Sobel (1970) focused on institutional constraints as additional market imperfections creating skill shortages to explain how shortages could exist at the same time as high levels of unemployment and worker displacement. They defined a shortage as "a situation existing over an extended period of time in which employers were unable to hire at going wages or salaries sufficient numbers of qualified persons to fill positions for which there were budgeted funds and for which personnel were required to meet existing demands for services (Frank & Sobel, 1970, p. 7). Based upon their analyses of six occupations in the Chicago and St. Louis labor markets during the mid–1960s, they concluded that market pressures often were insufficient to increase supply. They concluded that wage changes, by themselves, were weak policy instruments for reducing shortages.

More recent studies by Cohen (1995) and Trutko, Barnow, Chasanov, and Pande (1993) have taken the approach that no single empirical measure of skill shortages exists. More likely, none is likely to be developed (Veneri, 1999, p. 17). Instead, a variety of indirect indicators, many statistical and some anecdotal, are assessed to investigate the existence or potential of a skill shortage. For instance, Cohen (1995, pp. 29–39) recommends the use of the following indicators:

1. Occupational unemployment rate—This indicator is something of a misnomer because a person cannot be in an occupation and unemployed. Instead, this indicator refers to the last or most

recent occupation of the unemployed person. Clearly, the unemployed might seek jobs in any occupation, not just the one from which they separated.

2. Averaged changes in occupational employment—This indicator reflects the trend in the demand for labor.
3. Weekly wage changes for full-time workers in an occupation—This indicator reflects the intersection of supply as well as demand conditions. However, most wage data are collected for all workers, not merely new hires whose wages might reveal market effects of a shortage more than for tenured workers.
4. Forecasted occupational employment growth—Such a forecast is conditioned on assumptions and changes about future economic structure. Comparisons are made between likely occupational supply and forecasted employment.
5. Forecasted occupational replacement openings—Job openings in occupations are due to employment growth and the need to replace workers who die, retire, or otherwise leave the occupation. Existence of openings indicates a shortage.
6. Aliens receiving labor certifications—This indicator tracks foreign-born, non-U.S. born workers receiving permanent labor certification allowing immigration for work in the United States. The major advantage of this indicator is that it summarizes independent determinations made on thousands of cases in which employers assertthey cannot find and hire citizens of the United States.

RESPONSE

Is the identification of evidence for a skills shortage sufficient to justify investment in training to alleviate the shortage? Certainly not by itself. Other alternatives to training investment are possible and need to be considered as training policy is specified.

Perhaps wages offered are inadequate to ensure an adequate supply of human capital. However, as Frank and Sobel (1970) observed, labor markets often a slow to respond to wage changes. Improving working conditions is another alternative. For instance, perhaps more and higher quality school teacher would seek teaching employment if the workplace of the school was less autocratic and bureaucratic. Also, non-wage compensation such as benefits and other amenities might help improve supply. For example, Santa Clara County in California, the home of Silicon Valley, is finding it hard to attract teachers because housing is priced too high to be affordable on teachers' salaries. Therefore, under consideration is the development of teachers' housing (described by some as "teacher ghettos") that would be subsidized partially or completely.

Among the other options available for alleviating identified labor shortages include:

1. Making it easier and more attractive for older worker to choose not to retire,
2. Enticing skills immigrants and relaxing immigration restrictions for skilled workers in demand,
3. Inducing workers currently out of the labor force to re-enter,
4. Substituting workers with similar or transferable skills to enter the occupation which has a short supply of workers,
5. Reducing barriers to entry into occupations by relaxing credentialing and licensing requirements that are not shown to be essential for job performance, and
6. Encouraging geographic mobility of workers within the country to regions with skill shortages.

CONCLUSION

No single source of information provides evidence for the existence of a skills shortage. Rather, multiple, indirect indicators using existing data might represent the best source of information available. Even if a skills shortage is identified, training is only one solution among many that are possible to alleviate the shortage.

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ANALYSIS OF TRAINING NEEDS FOR EMPLOYEES OF INTERNATIONAL FIVE-STAR HOTELS IN TAIPEI, TAIWAN

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Index: Training and development, employee training, training program, human resource management, manpower development

Abstract: The main purpose of this study is to explore the training demands of the employees working at the international five-star hotel in Taipei. The study is based on the questionnaire to those who work at four Taipei's international hotels and their departments, such as Front Desk Department, Food & Beverage Department and Room Department, are frequently interactive with their customers.

INTRODUCTION

There are many reasons driving the HRD to harmony with the strategic business plans, and HR plans. The purpose of HRD is the fundamental reason for organizational existence. As following:

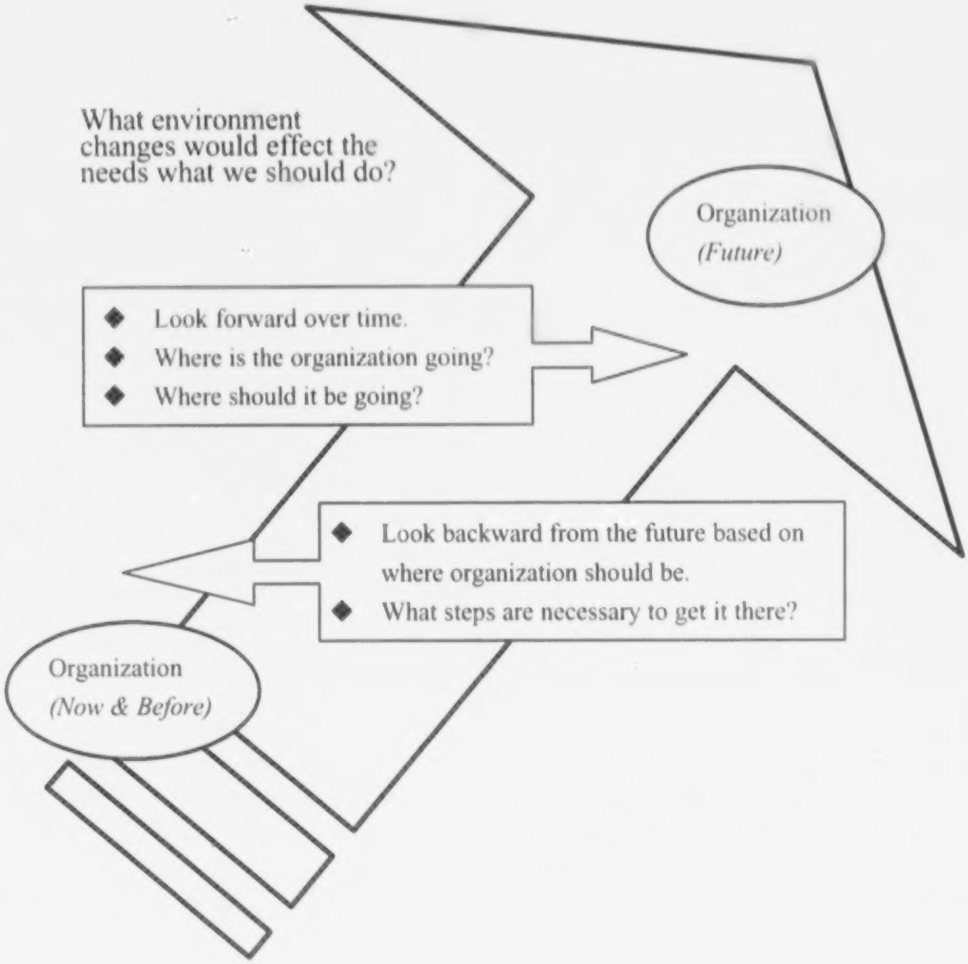
The purpose of human resource management

- HRD can be driven by organizational and Hr plans,
- HRD can be driven by perceived learning needs of managers and employees.
- HRD can be driven by comparisons between organizational plans and individual objects.
- HRD can act as a tool for aiding top management strategists define business and HR plans.
- HRD furnishes learners with artificial experience tied to organizational and HR plans.
- HRD provides feedback about implementation of plans in subsequent planning.
- HRD provides information to strategists about organizational strengths and weaknesses.
- HRD serves the inarticulated needs and interests of strategist.
- HRD shows people how to think strategically.
- HRD focuses on specific issues, problems, or projects of significant strategy to organization.

Identifying future learning needs

The significant keys in environmental scanning for human resource management, is to anticipate future learning needs based on present trends. Beginning with a broad overview of the future-oriented needs assessment, we will know how future-oriented needs can relate with the external groups like general public, consumers, suppliers, and distributors, and internal groups like people in workplace, individuals, and jog categories.

Future What environment changes would effect the needs what we should do?


What environment changes would effect the needs what we should do?
Organization (Future)
◆ Look forward over time.
◆ Where is the organization going?
◆ Where should it be going?
◆ Look backward from the future based on where organization should be.
◆ What steps are necessary to get it there?
Organization (Now & Before)

The purpose and method of the study

The main purpose of this study is to explore the training demands of the employees working at the international five-star hotel in Taipei. The study is based on the questionnaire to those who work at four Taipei's international hotels and their departments, such as Front Desk Department, Food & Beverage Department and Room Department, are frequently interactive with their customers.

There were 300 copies of the questionnaires had been distributed and 257 of them returned with the effective rate of 85.6%.

Discovery of Study

1. Characteristics of people taking the questionnaire

    Sex : Mostly female
    Age : First – 31~40 Second – 21~30
    Education : First – Senior High School Second – Junior High School & Junior College (Most not related to Tourism)
    Department Classification:
    Front Desk Department – 40%
    Food & Beverage Department – 35%
    Room Department – 25%
    Position : Basic Level Workers – 74%
    Work Experience under 5 years: 84%
    (Most of them do not have long work experience in this industry)

2. Generally, the hotel employees have the demand for Professional Knowledge most. Second is Management Knowledge/Skills. Not too many people want to know Tourism related Knowledge & Information.

3. Individual backgrounds influence employees' training demands strongly

    (1) The employees of Front Desk Department commonly have higher training demands for Professional Knowledge, Management Knowledge/Skills and Tourism related Knowledge & Information – much higher than Food & Beverage Department and Room Department.

    (2) The training demands of the basic level workers are generally higher than those of supervisors

    (3) The training demands of the employees whose work under 5 years are higher than those of employees whose work experience between 5 and 10 years.

    (4) Male employees show higher training demands than female ones on all other courses, except language (English / Japanese), personal communication skill, hotel developing plan & external advanced training.

    (5) The younger employees are more eagerly to know Tourism related Knowledge & Information

    (6) The junior college graduates have higher demands for all categories knowledge than the high school graduates.

    (7) No matter they are the tourism education background or not, their knowledge demands are no big difference except computer courses, dining & menu design and human resource planning & management.

4. Individual point of view & evaluation for training activities

    (1) The employees of Front Desk Department think that the training courses are beneficial to the current / future jobs and also satisfied to the current training relatively.

    (2) The attitude of basic level workers to the training is positive and good for the future jobs & promotion. Their satisfaction and voluntary orientation of training are higher, too.

    (3) The less experience employees think that the training will help them on the current jobs and future promotion. They are more willing to attend the training than the more experience employees and mostly voluntary.

(4) Male employees show more affirmative attitude than female ones to the benefit of training for the current jobs and voluntary attending the training.

(5) The employees whose ages above 36 think that training are more beneficial to self-developing. The age 26 ~ 30 group has the highest rate of training attendance.

(6) The higher education they are, the higher affirmation of training to the current jobs they have, same as the voluntary attendance of training.

(7) Most of the employees' evaluation and opinions for the training are similar – good for self-developing, no matter what kind of education backgrounds they are.

5. Priority of training forms – for future duties, periodic training, non-periodic training

The employees are very glad to attend those training that will benefit to their current jobs and future duties. Periodic & Non-periodic trainings provide the knowledge/skills for their routine operation, and also to catch up the fast step of the hospitality industry. Most of the employees' education backgrounds are not tourism; it is necessary to provide the certain training courses by the corporate.

6. The employees who like to attend the training are more satisfied about the courses and also more voluntary to receiving the training.

7. Other discovery – Room Department: Most unique department at hotel

(1) The majority of members of Room Department are aged female employees. Because of the special characteristics of their work contents and skills, it is very hard to alternate their works with other departments. They have relatively lower demands for training than other two departments.

(2) Generally, they have longer work experience and lower resignation rate than those ones at other two departments. It seems contradictive to the hypothesis – "the more training, the less resignation" in the study. Then we find out the reasons and explanation. The work contents of Room Department require the employee with special knowledge & skills but monotonous, containing a lot of labors. The elder employees are more stable than the younger ones.

CONCLUSION

1. Professional knowledge/skills related to current/future jobs are the most important demand of training
2. Individual backgrounds influence employees' training demands strongly
3. Age, work experience & sex influence employees' point of view & evaluation to training
4. Substantial gap exists between reaction and satisfaction to training
5. The employees who like to attend the training are more satisfied about the training courses and also more voluntary to receiving the training
6. The employees are very glad to attend those training that will benefit to their current jobs

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AN EVALUATION ON THE EFFECTIVENSS OF A 9-MONTH INTENSIVE FULL-TIME PROGRAM FOR THE UNEMPLOYED

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Index: Evaluation, Effectiveness, Training Program for Unemployed

Abstract: In September 1998, the Vocational Training Council (VTC) and the Employees' Retraining Board (ERB) jointly conducted a 9-month intensive full-time course in various training institutions for the unemployed persons who were adults of 30 years of age or above and had attended Secondary 3 education. The aim of this course was to provide employable skills so as to enable them to be better equipped when they rejoined the work force in the service sector. The title of the course was Certificate of Skills Training (Service Industries) (CST (SI)).

This paper tries to evaluate the *effectiveness* and *usefulness* of the course in the following aspects:

a) meeting the needs of employers
b) providing suitable retraining to the unemployed
c) developing a life-long learning attitude towards the unemployed
d) giving career counseling

Finally, this paper will also highlight the role of the VTC in the retraining sector in Hong Kong.

INTRODUCTION

Owing to the rising unemployment in 1998, the Certificate of Skills Training (Service Industries) Course was introduced as one of the measures to tackle the problem. The course was designed to cater for 1,000 unemployed persons with the aim of provision of broad-based generic and transferable skills in order to assist them to re-enter the job market.

The curriculum of the course was thus focused on the generic and transferable skills immediately applicable to the work place. The course was conducted on modular basis at three different levels i.e. basic, intermediate and higher level. Students might take one module at basic level and another at intermediate/higher level provided he/she had sufficient achievement in the module concerned.

MEETING THE NEEDS OF EMPLOYERS

Before the course commenced in September 1998, the VTC conducted a postal survey together with a consultation meeting with major employers in Hong Kong in July 1998 with the aim to assess the real needs of employers. For the postal survey, 8 out of 13 trade associations completed and returned the questionnaires and indicated that the program was comprehensive enough to cover basic skills for a junior clerk in service industries. Although it might be argued the size of postal survey was small, it should be noted that the trade associations selected were very representative, reflecting over 200,000 employers' views. For the consultation meeting on 21 July 1998, 5 out of the 22 major companies had sent representatives to attend and their responses were favourable. Most of the others had already given either verbal or written favourable comments.

Based on the postal survey and the consultation meeting, the course curriculum would then be focussed on the (a) commercial and business knowledge; (b) language and communication skills; (c) computer knowledge; and (d) soft skills.

A survey on employers who took on the graduate retrainees had been conducted in August 1999. Among 53 employers interviewed, 89% of them opined that the retrainees' performance was "acceptable" or "satisfactory". The employers were very impressed by the working attitude and interpersonal skills of the graduate retrainees as 69% of them rated their working attitude as "good". Besides the employers considered that the skills level in areas like job skills, computer techniques and English language skills was average to good. Less than 20% of them opined that the retrainees needed to put more effort to upgrade their skills level. Judging from the result of the survey, it could be concluded that the course would provide responsible persons with good working attitude and up-to-standard job skills and language ability and the needs of employers were met.

PROVIDING SUITABLE RETRAINING TO THE UNEMPLOYED

As most retrainees were unemployed and displaced from various sectors for less than one year before taking the CST (SI) course, the retraining program should provide suitable skills training, knowledge and skills in bookkeeping, retailing, office practices and customer service required in the job market.

The success of the program depends on the probability of re-employment of the retrainees and the positive feedbacks from retrainees and employers. Data for analysis was gathered from mail and telephone surveys conducted in December 1999 and June 2000.

Table 1 below indicates that 89% of the retrainees held positive view and found the knowledge and skills they learnt from the course were "very useful" or "useful".

Knowledge & Skills learnt from the course	No. of graduates	Percentage
Very useful	248	46.0%
Useful	233	43.0%
Not useful	57	10.6%
No comment	2	0.4%
Total	540	100.0%

Table 1 Feedback of Graduates on the course[1]

According to the survey conducted in June 2000, 81% of the retrainees found the skills gained from the module of Computer Application were very useful. For placement rate, 75% of the retrainees from the CST (SI) course were seconded for employment. It was a higher rate when compared with 70% placement target for all retraining courses (ERB Annual Report 1999).

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[1] First Report on Employment of Graduates of CST (SI), ERB, December 1999.

From table 2 below, 363 graduates out of 540 still stayed with the first job after graduating from the course at the time of the survey in December 1999. The overall success rate, measured in terms of retention rates, was 67%.

Employment	No of graduates	Percentage
Employed and stayed with job	363	67%
Employed but changed job	44	8%
Subtotal	407	75%
Without work	133	25%
Total	540	100%

Table 2 No. of Graduates stayed with the job[1]

For those graduates without work (133), 94% (125) indicated that they intended to search for a job. Table 3 below shows such an intention.

Continue to search for a job	No. of graduates	Percentage
Yes	125	94%
No	8	6%
Total	133	100%

Table 3 Intention to find a job[1]

Judging from the encouraging placement rate (75%) and retention rate (67%), it could be concluded that the CST (SI) course was successful in providing suitable retraining to the unemployed in Hong Kong.

DEVELOPING THE LIFE-LONG LEARNING ATTITUDE

Mr. Tung Chee Hwa, the Chief Executive of the HKSAR Government, put forward the "life-long learning" concept at his 1998 Policy Address. One of the objectives of the CST (SI) course was to satisfy the above mission i.e. to develop the life-long learning attitude so that the retrainees could attain the new skills required for our modern society.

Previously, retrainees did not consider the concept of "life-long learning" significant. Maybe "Fond memories of school learning are rare and in most people's minds knowledge acquisition seems to stop when they leave school. It is no surprise that life-long learning is usually not part of our mindset." (Prashing, 1998).

Now after studying the course, the learning attitude of the retrainees was changed. They believed that only by keeping their continued learning attitude right they could take up new skills or develop their existing skills needed in this competitive job market.

A Certificate in Vocational Studies evening course started last year at the IVE (LWL Campus) which allowed the graduate retrainees of the CST (SI) course to enroll in its second year. This was a further training opportunity arranged for those whose knowledge and working skills needed improvement. It was well perceived by the retrainees that the course was to improve their vocational skills and to lead them to attain higher qualifications, while working in the daytime.

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[1] First Report on Employment of Graduates of CST (SI), ERB, December 1999.

In order not to have the unpleasant experience of losing job, the life-long learning was definitely in the retrainees' mind now as Mr. Tung's 1999 Policy Address pointed out that everyone should embrace life-long learning to face a knowledge-based economy in the information age (Policy Address 1999).

GIVING CAREER COUNSELING

At the start of the course, each of the five IVE campuses appointed at least one placement officer to provide career counseling to the retrainees. These placement officers were all involved in teaching duties throughout the course so that they could develop rapport with the retrainees and get to know them better. When the program was completed in September 1999, the placement officers stayed centrally in the CST (SI) Placement Office in Kwun Tong campus and continued to offer post-course placement and counseling services for the graduate retrainees for a further period of nine months. In order to enhance the retrainees' employability and encourage them to use the career counseling service after their graduation, the placement officers designed, promoted and conducted Powerpoint courses, DacEasy (for accounting) courses, Interview Skills seminars, Labour Ordinance seminars and the like. This proved to be successful as 182 (headcount) graduates attended the above activities in the Kwun Tong Campus. Moreover, all these efforts resulted that at least 30% of those unemployed graduates visited the CST (SI) Placement Office and used its services each month. The main duties of the placement officers were described as follows:

1. *Studying the individuals and providing encouragement* - The placement officers had been helping retrainees to change goals and directions to meet the challenges of changes in the future workplace.
2. *Providing advice on resume writing and interviewing techniques* – Apart from assisting the retrainees to produce highly readable and presentable resumes, the placement officers had been arranging and conducting mock interviews with each retrainee. Accordingly, 60% of the graduate retrainees successfully secured a job within the first three interviews[3].
3. *Surveying occupations and matching them with the individuals* - The placement officers had been studying the nature of the job vacancies through telephone conversation with the employers and selecting potential candidates for job interviews. Some employers told the placement officers that the job matching service in the VTC was more efficient and effective as the referrals of relevant candidates were done within a very short period of time.
4. *Providing on–going support* - For every three months, the placement officers had to telephone all retrainees to conduct an employment survey. The placement officers gathered information from both employed and unemployed retrainees and developed further action plans to assist them.

All the above helped the retrainees (i) feel valued and appreciated, (ii) change their perceptions, (iii) restore confidence, and (iv) show more initiative and effort in job searching. Their change in attitude and the rise in morale had resulted in VTC achieving a placement rate of 80% as at 31 May 2000. Of the 506 retrainees who graduated in the program, a total of 404 had been placed into employment. Therefore it could be said that the placement officers had been playing a very supportive role and monitoring the retrainees' job search process with great success.

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[2] CST (SI) Placement Office Monthly Report.

[3] CST(SI) Placement Record

CONCLUSION

Since the CST(SI) course was a pilot course of unusual scale in terms of the number of retrainees enrolled and its long duration, it was obvious that the course would encounter quite a number of comments. The comments, which the writers believed to be acute, were listed as follows:

1. *On course content.*

   Although the course was in general regarded as useful, contents in different subject areas were criticized for being overlapping. However, this problem was resolved as various subject panel meetings across different campuses were held throughout the academic term.

2. *On course delivery.*

   It turned out that a lot of retrainees were overqualified and thus it caused difficulties in course delivery because of the great diversities in education background. As an attempt to handling this problem, most lecturers worked very hard in preparing supplementary training materials for those overqualified students in order to meet their genuine needs.

3. *On publicity.*

   It was complained by some applicants that they missed the advertisements on the course. The application period should be lengthened and more widely publicized so that every one who was interested in the course could apply on time.

4. *On course duration.*

   The 9-month full-time course was often regarded as too long. This was a reason why quite a number of retrainees dropped out from the course for placement purpose. One suggestion put forward was to set up a part-time evening modular program.

It had to be emphasized here again that this was a pilot course for ERB, and thus ERB had to critically evaluate the costs and benefits of the course before it could make a conclusion to re-run the course again or not. Based on its recommendation in the review report conducted by the ERB in October 1999, it was suggested to restructure the 9-month full-time course in the following two ways:

1. A modified mode of delivery i.e. a 2 to 3 month intensive full-time training program plus part-time follow-up modules to meet the objectives of the course.
2. A genuine modular structure i.e. upon completion of each module, a modular certificate would be awarded. Accumulation of a required number of modular certificates would lead to certain vocational qualification.

Although the course was short-lived i.e. lasting for only a year and subject to the above comments, the 9-month intensive full-time CST (SI) program was still considered effective in providing valuable training opportunities to the unemployed and in enhancing their employability and confidence in the job market.

The roles that the VTC had played were highlighted as follows:

1. *As a course provider.*

   The provision of retraining programs in the IVE campuses was popular with retrainees as the facilities such as mass lecture hall, self-access learning centre, library, students' canteen and computer room etc. were abundant.

2. *As an administrator.*

   The VTC had developed a functional mechanism such as the holding of numerous subject panel meetings, the conducting of the train-the-trainers workshops and the designing of a standardized teaching package for course coordinators in delivering their lectures.

3. *As an accrediting body.*

   The 9-month CST (SI) course was accredited by the VTC. It was hoped that the VTC would establish a framework for vocational qualification, which would provide retrainees with official recognition of vocational training. This could be expanded to the accreditation of all kinds of retraining programs whether they were in full-time or part-time manner, in day-time or part-time evening mode, and on modular or stage-based basis.

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AN EXAMINATION OF THE CONCEPT OF PROVIDING LEADERSHIP DEVELOPMENT FOR ALL STUDENTS AS AN INTEGRAL PART OF CLASSROOM INSTRUCTION

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Index: Leadership Skill Development, Employability, Instruction Planning

Abstract: The concept of having all career/vocational/technical students develop leadership skills in addition to their other salable skills is recognized by both educators and employers. Total student development is necessary for all students to ensure successful roles in society, and to enter the labor market. Incorporating leadership skills in the instruction, improves the quality and relevance of the instruction, develops student leadership, enhances citizenship responsibilities, overcomes sex and race discrimination and stereotyping, and benefits all students including special populations and minorities. Occupational skills need to be enhanced with skills that enable the student to communicate with employers and do well in the workplace.

PRESENTATION

The concept of having all career/vocational/technical students develop leadership skills in addition to their other salable skills is endorsed by federal and State guidelines for conducting programs. The Policy Statement (National Coordinating Council, 1998), of the United States Department of Education, For Vocational Student Organizations, includes, ". . . . total student development as being necessary for all vocational-technical education students to assume successful roles in society, and to enter the labor market". The same statement continues, ". . . . to improve the quality and relevance and instruction, develop student leadership, enhance citizenship responsibilities, overcome sex and race discrimination and stereotyping, and serve students of special populations, especially with respect to efforts to increase minority participation in these organizations".

Teachers are urged to incorporate leadership development into their instruction based on the following rationale:

a) Occupational skills need to be enhanced with skills that enable the student to communicate with employers and do well in the workplace.

b) School activities tend to be minimized for students studying business and vocational-technical education due to the nature of the program and their involvement with field-based experiences/part-time supervised employment. Missing participation in activities such as student government, clubs, and other extra curricula activities, is compensated for by learning leadership skills in class/shop-laboratory experiences.

c) Values and qualities acquired through leadership development help the student develop a stronger self-image and enable students to get along better with others in their personal and workplace life.

The focus of teachers is to have students learn occupational skills first, and then if time is available, have students learn some leadership. Usually there is never any time made available for this in the instructional program. The federal government's (Office of Education's) approach to this concept is to encourage educators to have leadership development integrated into the instructional program, and the burden for doing this falls to teachers and instructional leaders. It is appropriate when a school has a Future Business Leaders of America (FBLA) (1995), Vocational Industrial Clubs of America (VICA) (1996), An Association of Marketing Students (DECA) (1997), and other organizations, but the point that is missed is that every class and every student are supposed to have these leadership experiences, according to good education practice. When each class has a career and technical student organization (ctso) or other classroom-related organization, there are many sets of officers, agendas, programs, etc. that actually expose all students to leadership skills. These activities usually take place in class once a week for a twenty to thirty minute meeting and program. Many teachers who participate in leadership instruction, arrange for this to take place during school time and class time as an integral part of the instruction. When programs are not obligated to a central or government agency, they should recognize the need for incorporating leadership skills into the existing instructional program.

In starting out to incorporate leadership skill development in the instructional program, the teacher could use a generic approach. Instead of being concerned about joining a national organization, a generic organization could be organized right in the class or shop/laboratory. Students studying Business Law or Welding or Electronics could be in the Business Law Club or Welding Club or Electronics Club, and they could elect officers, plan short weekly meetings in class, plan an agenda, and have programs that involve local employers or advisory committee members as speakers, or plan field trips. As part of this new activity the class could go on a field-trip to visit another class of the same subject at a nearby school. The two teachers would plan a program for that period which could include exchanging information about what is being studied, equipment being used, and if time allows, having a guest speaker. Students would meet each other and see that the same subject matter is being studied elsewhere. The realization that there are many students of the same backgrounds and/or interests, is a positive factor in the student's leadership development. Students are also able to netwok with each other and with employers.

As time moves on, and the generic organization is established with officers and weekly meetings in class, the teacher can then introduce the idea of national affiliation, regional and State events and conferences, and national literature and magazines. This slow approach works very well with teachers and/or students who may be overwhelmed with starting out with national affiliation from the very beginning.

It should be noted that there are other organizations that have materials on leadership skills that could also be utilized in the classroom. Teachers could use materials from business and industry, journals, and other publications that have articles concerning leadership. This information can be used in a variety of ways in the classroom. Examples of organizations that have information and materials on leadership include: Junior Achievement (1996), Toastmasters (1992), DeMolay International (1996), International Order Of The Rainbow For Girls (1997), 4-H School Enrichment Program (1997), Kiwanis, Rotary, and many other groups interested in the development of young people. Special recognition goes to the Junior Achievement Program that assigns regular visitors/speakers/advisors from business/industry to visit classrooms on a routine basis. No other organization or student organization has such an arrangement on a wide scale.

Although learning and developing occupational skills in school is primary, it is another thing to be able to communicate and get along with employers, customers, co-workers, fellow students, and teachers. Leadership skills enable a student to "sell" their occupational skills to employers and use them in the workplace. Without the leadership skills, many students never get to the workplace or are unable to remain in the workplace. The National Coordinating Council For Vocational Student Organizations (1990) points out the importance of leadership skills for every student studying to prepare for careers in business, industry, and service occupations.

In schools that have formal memberships in the recognized ctso's, every student in the classroom/shop should still be included in the leadership skill development instruction, even if they are not a dues paying member.

Research (Bell, 1989) (Lankard, 1996) has shown that students who had been involved with student organizations were:

- more likely to be involved in community affairs and organizations, school organizations, church groups, etc.
- able to gain professional experience and establish contacts with employers
- gain more poise, confidence, and strengthen personality traits.

The information that is to be taught according to Saulness (1990) is:

Personal Leadership
Group Dynamics
Communication
Officer Responsibilities
Project Planning.

Also included is Planning A Leadership Retreat, for students and advisors. These leadership skills and activities are incorporated into the marketing instruction program.

In the VICA Professional Development Program (1995), master competency lists and the instructional content are included for students in the following broad categories:

Work Force Awareness
Self-Improvement
Civic, Social and Business Awareness
Work Force Basics
Professional Strategies
Career Planning
Post-Competencies.

These competencies are to be studied in addition to the specific occupational area of the student.

The Marketing Education (MarkEd) Resource Center (1993) developed a learning activity package, *Leadership in Business*, to be used by students and instructors in examining leadership and its benefits. Included in this packet are:

Define Leadership
Characteristics of Each Type of Authority

Benefits of the Use of Leadership
There Are Different Leadership Styles and Traits
Three Distinct Categories of Leadership Style
Prevalent Leadership Theories
Six Important Leadership Techniques.

This package also examines increasing productivity through leadership, and then moves into leadership in business.

An example of a comprehensive textbook for secondary school students is by Ricketts (1996), Leadership - Personal Development & Career Success. This book is endorsed for use by students of agriculture, and includes the following:

Understanding Leadership
Communication and Speaking Before a Group
Leading Individuals and Groups
Conceptual (Thinking) Skills
Personal Development
Transition to Work Skills.

The instructor interested in incorporating leadership development in class could use an experience-based approach, contextual learning, for students. In explaining how students will participate in organizing and conducting their class-related organization, the following steps are to be included:

Electing Officers
Training/Preparing Officers
Defining Officer Responsibilities
Learning Parliamentary Procedure
Planning and Conducting Activities Related to the Instruction.

As the instructor implements leadership skill development, the emphasis is to have students gain insight into the kind of personality and leadership skills that are most appropriate to the field being studied. Students are able to identify the soft skills that are necessary in the workplace. In some occupations the emphasis may be working with customers or clients, while in other fields it may be working with supervisors or co-workers. Another concern is to have students identify whether productivity or quality control are key components of their chosen field. Being able to determine the expectations of management for personnel performance, and seeing how workers react is valuable to students. As students are more aware of leadership skills in the workplace, and how they are implemented, they will be more effective workers. Communicating more effectively, exercising critical thinking, setting goals, reflecting positive values, and getting along with others, will help students to be more successful in their personal and professional lives.

Between the numerous leadership materials from business and industry, and materials from professional groups, there is an ample supply of literature to be used by instructors and students. Encouraging more teachers to incorporate leadership skill development as instruction related to the specific career area is both a challenge and a need. Facilitating the student's ability to function in society and in the workplace serves a common interest.

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CONTINGENCY THEORY IS OF LITTLE VALUE IN HELPING LEADERS OR POTENTIAL LEADERS TO PERFORM SUCCESSFULLY

Mr Eric Cheng

Keywords: Leaders; Contingency theory; Maturity of Subordinates; Task Motivated; Relationship Motivated; Taxonomy of Decision Process

Abstract: Contingency Theory does not provide a recipe to problems, but some argue that it could provide an action list. I am going to discuss the Contingency Theory of leadership in the light of whether it enhances performance. Contingency Theory is one that if we know which particular leadership style in a particular situation is more appropriate, the leader will adjust his behaviour to the situation in order to enhance performance, subordinate's job satisfaction, etc. The beginning section of the essay will be devoted to a literature review and a discussion on the theoretical framework on the three approaches of the Contingent Theory. Later cases indicate how Contingency Theory was applied, or was ostensibly applied to the administration of an academic section in a university in Hong Kong. The essay concludes by identifying practices which might enhance performance of contingent leaders.

INTRODUCTION

Contingency Theory does not provide a recipe for solving problems, but some argue that it could provide an action list. I am going to discuss the Contingency Theory of leadership in the light of whether it enhances performance. The beginning section of the essay will be devoted to a literature review and a discussion on the theoretical framework on the three approaches of Contingency Theory. Later cases indicate how Contingency Theory was applied, or was ostensibly applied to the administration of a university in Hong Kong. The essay concludes by identifying practices which might enhance performance of contingent leaders.

THEORETICAL FRAMEWORK

Definition of Leadership

Although Bryman (1986) refuses to list in his book a wide range of definitions for leadership, he nevertheless gives one after his literature review. Surprisingly enough, the definitions from different authors seem to have converged to one definition from Stogdill (1950), which is quoted below as my starting point for subsequent discussion:

> *Leadership may be considered as the process of influencing the activities of an organized group in its efforts toward goal setting and goal achievement.*

Contingency Theory

Different leadership styles are appropriate to different problematic situations. Bryman (1986:158) concludes from the approaches of Fiedler, Hersey-Blanchard and Vroom-Yetton, that Contingency Theory is one that if we know which particular leadership style in a particular situation is more appropriate, the leader will adjust his behaviour to the situation in order to enhance performance, subordinate job satisfaction, etc.

Firstly, I would like to quote Hersey and Blanchard's model as follows, basing on Beare et al's (1989:104) interpretation:

> *Hersey and Blanchard (1982) proposed in their situational theory that leadership behaviour should be varied according to the maturity of subordinates or followers. The situation in this theory is thus defined by maturity, with two dimensions proposed: professional maturity and psychological maturity. There are also two dimensions of leadership behaviour: task behaviour, in which the leader emphasises or specifies the tasks; and relationship behaviour, in which the leader invests time in developing good interpersonal relationships with and among the group. The theory proposes four general types of leadership behaviour, each of which is appropriate to a particular level of maturity. With increasing maturity, the leader should move through styles designed 'telling' (high task, low relationship); 'selling' (high task, high relationship); 'participating' (low task, high relationship); and 'delegating' (low task, low relationship).*

Secondly, I would like to quote Fiedler's theory from Beare et al's (1989:105) again as follows:

> *Fiedler found that task-motivated leaders (those whose primary, driving motivation is to ensure that the task at hand is addressed) tend to be best suited to situations which are either highly favourable or highly unfavourable according to the extent to which tasks are structured, where there are good leader-member relations and when the leader has position power. Relationship-motivated leaders (those whose primary, driving motivation is to ensure that there are good relations with and among members of the work group) are best suited to situations which are moderately favourable on these dimensions. The Fiedler theory has implications for matching leaders to situations and for encouraging leaders to modify their situation where possible to ensure consistency with style.*

The former identifies both directive and supportive behaviour in a leader, which can be modified according to the level of development, experience and commitment of the subordinate. Intuitively it is credible but it relies on leaders being knowledgeable about the development of their employees and sophisticated in switching behaviour when appropriate.

The latter theory has shown that when the situation is particularly favourable or unfavourable to the leader a task-orientated leader is more effective. When the situation is neither particularly favourable nor unfavourable a people-orientated leader is more effective.

Further, I would quote Vroom-Yetton contingency model which places emphasis on participativeness from Bryman (1986). The theory is normative and it sets out standards and rules for others to follow, it is now stated thus:

> *The aim of the approach is to enable the leader to enhance both the quality of the decisions that he or she makes and also their acceptability to subordinates. A good quality means a good performance while a high acceptance by the subordinates means a good implementation of decision and the guaranteeing of a good outcome. Bryman (1986: 151) sets out Vroom's 'Taxonomy of decision processes' which lists out the Autocratic AI and AII, the Consultative CI and CII, and the Group Decision GII. These five approaches to leadership are on a continuum of participativeness with AI and GII at the extremes. Vroom's model further proposes seven 'rules' which allow the leader to eliminate step-by-step those styles which are not feasible. Bryman suggests that the idea is for the leader to follow through each rule in order to discover appropriate styles in view of the circumstances.*

> *According to the Vroom-Yetton model, a leader should be both autocratic and participative, varying his style according to various situational factors.*

Vroom's approach differs from Fiedler's in respect of how the matching should be achieved. Fiedler's emphasis is upon changing the situation; Vroom's is on making the leader more aware of the implications of the situation for his behaviour.

The Managerial Grid Schema is quoted by Bryman (1986:75). It is not directly related to Contingency Theory but is part of the leadership style theory. He quotes thus:

> *The infrastructure to their approach is a contrast between two approaches to the managerial role: concern for production and concern for people. Both concerns are essential ingredients of effective management.*

Imagine a square grid with five sets of co-ordinates, with x-and y- axes in a scale of 9. (1,1) is called impoverished management with conflict likely to be rife. (1,9) is country club management and people are not pushed to produce. (9,1) is task management, where management sees its job primarily in terms of controlling and directing subordinates and planning their work. (5,5) is a middle-of-the-road position, with emphasis on both dimensions. (9,9) is called team management, which is a participative system, since people responsible for the production are also supposed to be involved in work planning and execution.

According to the research results found, managers often oscillate between (9,1) and (1,9) styles: the former in response to a need to enhance output, the latter when interpersonal relationships suffer.

It would have been a reason for the Contingent Managers to oscillate in styles for the sake of the two dimensions of concern.

PERCEIVED WEAKNESSES OF THE ABOVE MODELS

A number of criticisms and concerns have been identified by critics. Hanson (1996:172) has summarised the weaknesses for the models as follows:

1. The contingency variables are complex and difficult to assess. It is often difficult to assess the quantity of the leader member relationship, degree of structure of the task and the position power a leader has;
2. The model gives little attention to the characteristics of the subordinates.
3. No attention is given to varying technical competencies of the leader or the subordinates. The model assumes that both the leader and subordinates have adequate technical competence.
4. The correlations Fiedler presents in defence of the model are often low and statistically non-significant.
5. The Least Preferred Co-worker (LPC) instrument is open to question. The logic underlying the LPC is not well understood and studies have shown that the respondent's LPC scores are not stable.
6. There are other situational variables that can be important in determining the favourableness of the leadership situation; for example, stress, linguistic or cultural heterogeneity, organizational climate, and level of training.
7. It is doubtful whether a leader can switch leadership styles in the face of different types of problematic situations.

8. It is not understood what causes some people to become task-motivated and others relations-motivated.

The weaknesses pointed out in the above arise from the quantitative aspect of the Contingency Theory. It is paradoxical to note that the wider the application a theory is, the greater the uncertainty it will produce. The philosophical phenomenon that even our most successful theories cannot be said to be confirmed or verified, only corroborated or as yet unfalsified, still holds true. As leadership styles need adjusting to the changing situations, the theory is useful in certain situations, but not in all. This is illustrated by the following examples.

WHY IS CONTINGENCY THEORY OF LITTLE VALUE? - EXAMPLES

It is obvious that most of the leaders seemed to have been masters at selecting, synthesizing, and articulating an appropriate vision of the future. It is a common quality of leaders down through the ages. For example, a contemporary biographer of Napoleon, Louis Madelin, describes him:

> *He would deal with three or four alternatives at the same time and endeavour to conjure up every possible eventuality- preferably the worst. This foresight, the fruit of meditation, generally enabled him to be ready for any setback; nothing ever took him by surprise... His vision, as I have said, was capable of both breadth and depth. Perhaps the most astonishing characteristic of his intellect was the combination of idealism and realism which enabled him to face the most exalted visions at the same time as the most insignificant realities. And, indeed, he was in a sense of visionary, a dreamer of dreams.*

Napoleon was able to imagine the full spectrum of alternatives, from the best to the worst. No wonder nothing could surprise him.

The eminent journalist Dr. Cha Liang-Rong (Mingpao, 2000:12) has spoken about the changing of leadership should situation changes. In a forum delivered to "Journalism Revamping and Management Conference" at the University of Jia Jiang in China, he insisted that:

> *The Communist Party of China sets fundamental policy for the well being of the people. Liberty of expression (including the press) also treats peoples' interest as the top priority, as such the Press must obey the leadership of the Communist Party. However, it might be contingent on the situations. For example, should idiosyncratic policies like the " Great Leap Forward", or the "Cultural Revolution" (human disasters) be started again by the Communist Party, journalists and the press should readjust their attitude and direction to defend people's interest and to reflect the opposite views of the people to the Party Leader rather than to follow blindly.*

Dr. Cha had been the No. 1 target denonunced by the Communist Party during the 60s in China. He changed his style of leadership since China dropped the hostile attitude after the Open Door Policy. The above quotation shows how he applied the Contingency Theory to cope with different political situations.

I would like to quote application examples of the Contingency Theory in a university in Hong Kong. Within the university there is a College providing education and training to sub-degree programmes with 36% of the overall university student numbers. The Principal is the leader. There has been a change in style of leadership initiated by two consecutive Principals, two examples illustrate how Contingency Theory has been or should have been applied:

The Staff Performance Appraisal

The teaching feedback for staff performance has been a controversy. Imrie (1995:26) writes that the concepts of assessment, appraisal and evaluation as a form of staff performance need to be clearly understood by the staff.

Indeed in the College, the use of staff appraisal has never been a culture. Any attempt to introduce this idea is to be interpreted as offensive and intrusive into the individual's territory and dignity. In one occasion there was heated disgruntlement expressed by the majority of staff in a staff meeting provoked by a tentative suggestion for using student feedback to appraise staff. The rebellious staff showed their dissatisfaction toward the idea of appraising performance. Some even took an analogy as to express that a defendant is presumed guilty before the trial and which is contrary to common law.

In Hersey and Blanchard's terms, the College staff has not reached the degree of maturity both psychologically and professionally. Any leader wanting to instigate a new concept without surveying the degree of acceptability of his subordinates, in Vroom's terms, is doomed to fail. The fruit is just not ripe and the former Principal has not been forceful enough to push forward the performance appraisal.

However, by a swift turnabout, instead the Principal has emphasised the importance of portfolio approach for staff performance instead of the judgmental appraisal system. Contingency Theory is adopted here, the emphasis on change on the use of appraisal tools is something that should be avoided. According to Hersey and Blanchard's theory, a leader needs to gauge the maturity of his or her subordinates before deciding which pattern of leadership behaviour is required. Therefore as the level of maturity changes, a different leadership style is required.

The latter Principal tends to be a relationship-motivated leader. When he first took up the Principalship he put the appraisal issue aside. He set up work groups to monitor this problem. At that time, university culture favoured assessment of performance. The personnel office has made it a rule that all staff in the university would have to submit their appraisal based on a performance plan as agreed beforehand with an appraisor. When the Principal saw the chance, he made it mandatory to include the student feedback appraisal as part of the performance. Surprisingly, the resistance to the inclusion has been less pronounced. Therefore, as culture further develops, staff become more matured in relation to appraisal and accept the system with which they previously sought to resist. So this suggests that as situation changes, it requires a different leadership style.

A scale is developed to rate the maturity level of each subordinate and the leader. According to Hersey and Blanchard, leadership styles may be negotiated by leader and subordinate. Bryman (1986:150) quotes Graelf and Yukl as suggesting that the main contribution of the Situational Leadership is that leaders need to be flexible in their behaviour.

Shortening of Programme Duration

All along, the College has been running programmes which are of a 3-year duration. Although the other university has been running some programmes which are of a year shorter, nevertheless, such programmes only form a minority and as long as they remain in a joint admission system, there are no comparative advantages when recruiting students.

However, last year that university finally decided to withdraw from the joint admission scheme, to make way for upgrading to closer to a university status and to save money, perhaps. A big change seems approaching.

The latter Principal has set goals for the College. He has seen the impending change in the higher vocational studies in Hong Kong. Like in many previous occasions, he set up task forces, work groups and sub-committees to combat problems. A task force has been set up to address the question of whether to keep the same duration for the programmes in the College. SWOT exercises have been conducted to analyse the programmes, and the result is that the programmes are under no great threat. Since the latter Principal is a relationship-motivated leader, if there is no consensus for change, then he would see it to be illogical not to keep the status quo, especially when the shortening of programme duration may mean a reduction of resources from the Government.

Apart from the withdrawal of a partner university from the joint admission organization, the Government has recently published a report by the Education Commission advocating the establishment of a community college which may be of a two-year duration study. In order to be the first community college in Hong Kong to be set up by this university, the College received a mandate to shorten the programmes from 3-year to 2-year duration, making the College fitting into the Government's requirement, so an immediate change is necessary.

The change to a shorter duration meant a lot of hard work for the staff team. The College staff have been extremely busy in trying to adapt to the new academic system implemented by the university. Fortunately they have just got to the shore but then the mandate to reduce length may mean a complete revamp of the document and some of the previous hard work might have gone down the drain. Besides, the quality for squeezing a 3-year programme into a 2-year duration may be sacrificed. Had this need been identified much earlier on and earlier start instigated, such productivity loss might have been avoided.

Too much concern for the people might jeopardize performance. If a leader changes the style of leadership early enough he may still be able to take the opportunity to keep the same quality of performance no matter how hard a relationship-motivated leader tries to raise the morale, the effectiveness is still contingent on the future changes. Thus Contingency Theory has little value.

CONCLUSION

Contingency Theory is not to be seen as a specific guideline. It is a useful metaphor to help leaders to think and to reflect. The theory can be used to reflect on their usefulness. Contingency emphases congruencies and matching of the internal system with external environments.

Leaders tend to have good ideas but they are swamped by external events and cannot always immediately implement them, resulting in a blocking of these views. For example, positioning the enterprise is an external event. In order to produce the best result, therefore Contingency Theory in leadership style can be reinforced by the theory in organizational structure. Some useful practices might be used for leaders to position their enterprises:

1. Reactive. With this approach, the organization waits for changes and reacts - after realisation;
2. Change the internal environment. Instead of waiting for change to happen to them, leaders can develop effective forecasting procedures to anticipate change and then pro-act rather than react;
3. Change the external environment. The approach needs that the organization anticipating change acts upon the environment itself to make the change congenial to its requirements; and
4. Establish a new linkage between the external and internal environments. Using this mechanism, an organization anticipating change will attempt to establish a new relationship between its internal environments and the anticipated external environments.

As a reflective practitioner, Schon (1983:300) writes, " I am presumed to know, but I am not the only one in the situation to have relevant and important knowledge. My uncertainties may be a source of learning for me and for them". There is no need to put on the professional facade to pretend to know everything, the uncertainties could be a title for the next round of new knowledge.

Though Contingent Theory is unable to resolve these uncertainties, I find consolation that Vroom's Model provides a useful step by step approach in determining by elimination those styles which are not feasible. From this approach, a decision-tree structure emerges through which the leader follows the implications of each of the seven rules for his style of leadership. This approach reduces the arbitrary nature of the system that is inherent in Contingent Theory and is therefore to be favoured.

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CONTINUING PROFESSIONAL DEVELOPMENT TOWARDS EMPLOYEE EMPOWERMENT IN MANPOWER TRAINING: A NEW DOMAIN OF ORGANISATIONAL STRATEGY

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Index: Employee, Empowerment, Culture, Training

Abstract: In response to the growing complexity and dynamics of global environment, the key to success is to encourage employee to be responsible for the success or failure of the enterprise. The process for securing that employee involvement and creating change is employee empowerment. This paper provides an overview of the employee empowerment considerations pressing upon the managers' attitude and proposes an overall empowerment process management model and training curriculum in effective quality service delivery. It also reports on a case study investigating the current and potential existence, implementation and levels of training in empowering management styles in ten international property management groups in Hong Kong.

INTRODUCTION

In the realm of organisational strategy, employee empowerment has become a new topic that attracts research academics and practitioners. An empowerment approach encourages those employees to have more discretion and autonomy in organizing their own work. It also involves quality service delivery system in which employees can face the customers "free of rulebooks" and are encouraged to do whatever is necessary to satisfy them. Recently, many researchers point out that organisational strategies towards empowerment, which was often omitted in earlier researches, is a critical factor in determining the success of customer satisfaction. This paper takes its starting point from a general dis-satisfaction with current perspectives on empowerment, aiming to highlight some related issues and implications that may shape professional management development to empowerment in the new millennium.

LITERATURE REVIEW

While struggling with the changing climate in technological communication with access to the internet and electronic services, many organisations have brought in external experts who advise them on quality and restructuring. Empowerment is the process to give staff real authority in their work to achieve continuous improvement and job satisfaction in an organisation's performance for better quality products and customer service in order to remain competitive (Kinlaw, 1995). Empowerment encourages and allows individuals to take personal responsibility for quick response time to consumer needs and complaints with more warmth and enthusiasm. In recent years, employee empowerment has become a separate discipline that has attracted widespread discussion to achieve organisation's goals.

As to the individual perspective of empowerment, Spreitzer (1992) identifies four characteristics most empowered employees have in common: (a) sense of self-determination to choose how to do

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the work, (b) sense of competence to perform the work well, (c) sense of meaning to care about what are doing and finally, (d) sense of impact to have influence on the larger environment. Empowerment, then, is a mind-set that employees have an overall feeling of psychological empowerment about their role in the organisation. Menon (1995) indicates that greater job autonomy, increasing meaningfulness of the job, mentoring behaviours of the immediate supervisors and job satisfaction may increase the organisational commitment of the employees and increase their psychological empowerment in the workplace. It is observed that employee empowerment strongly associates with the nature of the job and the leadership commitment in developing an empowered workforce.

Regarding the organisational perspective of empowerment, some studies focus on how the sharing of power within an organisation is affected by the structure and culture of the organisation. The overall theme of this perspective is the relocation of power from the upper levels of the organisational hierarchy to the lower levels of rank-and-file workers Responsibility for the organisation success is shared by all members. An empowered workplace should be structured to encourage front-line employees to exercise initiative and imagination in solving problems, improving processes and meeting customer needs (Potterfield, 1999). Potterfield also addresses the need to create enthusiasm and commitment by development of organisational value and visions that are congruent with workers' values and visions. Furthermore, management job from this perspective is to create a culture of participation by providing a compelling mission, a structure that emphasizes flexibility and autonomy, rewards for participation and a lack of punishment of risk taking as well as ongoing involvement programmes (Honold, 1997).

EMPOWERMENT AND TOTAL QUALITY MANAGEMENT

The term empowerment is the process of giving staff greater authority or power to decentralize decision making without reference to higher levels and for which they are being held accountable whereby the managers give more discretion and autonomy to customer contact staff (Brymer, 1991). Empowerment programmes can transform a stagnant organisation into a vital one by creating a shared purpose among employees, encouraging greater collaboration and most importantly, delivering enhanced value to customers. It has been found that organisations with a commitment to employee involvement and empowerment also have a commitment to total quality (Lawler, Mohrman & Ledford, 1992). This concept stems from the current international stgrategy towards Total Quality Management (TQM). It is often based on a desire to gain competitive advantage, increase productivity and improve customer relationships through quality assurance issues. As to the origins of empowerment, empowered groups have often resulted from organizational change such as downsizing or by adopting a flatter structure. Therefore, employees often perceive empowerment as receiving additional tasks (Menon, 1995). Effecting such organizational change is probably the hardest aspect of establishing TQM. However, effective empowerment can bring most organisations many successes and achievements as employees learn about the connection among their decisions, actions and customer value. In addition, they become self-directed decision makers aligned with the shared purpose. In order to stimulate employees to become involved and empowered in business improvement programs, employees at all levels need to be given power, knowledge, information, and rewards that are relevant to business performance (Mohrman, Lawler & Ledford, 1996).

THE EMPOWERMENT PROCESS

The key to achieving empowerment for improved performance is for everyone in an organisation to have a clear understanding of what they are trying to achieve by empowerment and what they must do to achieve their purposes. The Empowerment Process Management Model (Figure 1) identifies the following six key steps in the planning, initiating and evaluating of an organisation's initiative to extend and strengthen empowerment. These steps make a closed loop process whose output is continuous improvement (Kinlaw, 1995).

- *Define and communicate* the meaning of empowerment to every member of the organization.
- *Set goals and strategies* that become the organizing framework for staff at every organizational level as they undertake their own efforts to extend and strengthen empowerment.
- *Train* staff to fulfill their new roles and perform their functions in ways that are consistent with the organisation's goals for leading an empowered workforce.
- *Adjust the organization's structure* so that it demands a flatter format, creates greater autonomy and freedom to act.
- *Adjust the organization's systems* (like planning, rewarding, promoting, recognising, training, and hiring) to support the empowerment of staff.
- *Evaluate and improve* the process of empowerment by measuring improvement and the perceptions of the organization's members.

These six elements in the model are linked together within a single rectangle to emphasize their relatedness. Around this large rectangle is a series of smaller rectangles which identify sources of critical inputs. The empowerment process can only be undertaken successfully if the following kinds of information and knowledge are well understood:

- *meaning of empowerment*;
- *payoffs* expected;
- *targets for empowerment* which provide a set of alternatives that everyone can use in targeting specific opportunities to empower themselves and others;
- *strategies for empowerment* which provide multiple alternatives for reaching the targets which individuals and organizations identify;
- how *controls for empowerment* differ from traditional controls and how these controls can be developed; and
- new *roles and functions* in which managers and other members of the organization must become competent for their performance to be compatible with the meaning and purposes of empowerment.

To minimize mistakes during the process and progress of empowerment, the necessary conditions must be created at the outset. These include the commitment from managers who are the key players in an empowered workplace, full involvement of employees / customers / suppliers and open communications. As empowerment does not exist in some universal form that can be applied to every kind of organisation, each organisation must test and learn as it goes. More importantly, staff must be well equipped with the kind of training required for empowerment such as high level analytical and problem-solving skills. This means that staff must be able to depend on their own good judgment and apply that judgment to more and more aspects of their work.

To sum up, the forces of global markets, escalating customer expectations, emerging technologies, shrinking natural resources and the new entrepreneurial spirit have altogether called for the need to reshape organisations and change the way of operation. It is believed that greater employee empowerment is that breakthrough opportunity for all businesses to leverage in improving their sustainable performance.

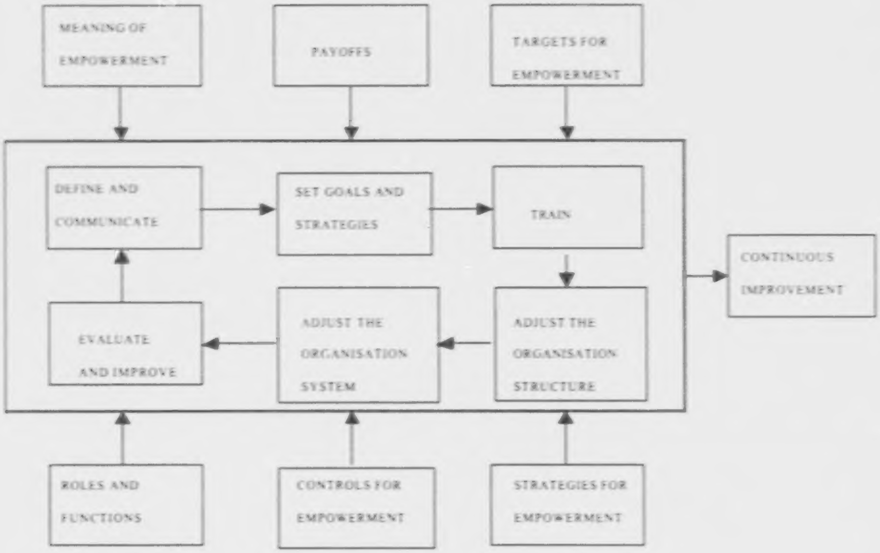
MEANING OF EMPOWERMENT
PAYOFFS
TARGETS FOR EMPOWERMENT
DEFINE AND COMMUNICATE
SET GOALS AND STRATEGIES
TRAIN
CONTINUOUS IMPROVEMENT
EVALUATE AND IMPROVE
ADJUST THE ORGANISATION SYSTEM
ADJUST THE ORGANISATION STRUCTURE
ROLES AND FUNCTIONS
CONTROLS FOR EMPOWERMENT
STRATEGIES FOR EMPOWERMENT

FIGURE 1: EMPOWERMENT PROCESS MANAGEMENT MODEL

Source :The Practice of Empowerment - Making the most of Human Competence, Kinlaw D. C.(1995)

ISSUES AND IMPLICATIONS

This case study project is ongoing and at this stage only an initial survey has been concluded. This involved informal interviews with company employees at different levels, including senior management, in five Hong Kong companies and five multinational corporations. The objectives of the pilot study were to gain a better understanding of the thinking and operation of the selected companies. The interviews comprised a faxed pre-interview question sheet followed by a one-hour in-depth interview with each of the subjects. Questions centered on the corporate office's definition, support, commitment and philosophy of empowerment now and in the future.

These findings present interesting prescriptive accounts of the reception of empowerment processes. Currently four of the ten companies are empowering a limited selection of employees, namely front line staff. At existing staffing levels, all of the companies considered that they employed sufficient property managers to make operational decisions. All of the companies considered empowerment to be a long-term policy that needed slow and careful implementation. All senior managers considered empowerment to be an educational process that started at college and needed to be followed up with constant education and training in the work place. Senior managers further perceived that different levels of empowerment were appropriate to different countries and that this depended on educational levels and when the country opened up to outside (economic) influences. They further believed that empowerment could only be implemented when basic operational training needs, systems and standards were fully established. Senior managers held the opinion that in the Asian culture, employees did not want to take responsibility, and instead rely on the manager to make decisions. It is noted that the growth and development of empowerment in Hong Kong has been much lower than the western developed countries. There are difficulties to progress employee empowerment as; according to the training managers; staff can not be trusted; people have poor judgment; and the value system is different because of relationships between expatriates and locals.

It is also observed that before employee empowerment can be seriously considered, the following three conditions should be met. Firstly, the empowerment philosophy has to be supported by the corporate office, and the general manager has to be fully committed. Secondly, the desired outcome of the programme has to be agreed upon by the general manager and the executive committee. Thirdly, specific goals and target dates should be established.

More recently new professions have emerged, led by respected individuals to be flexible, skilled and visionary to accept changes as everyday part of working life. Facilities Management services is a newer profession for corporate institutions and government bodies to outsource their workplace noncore business. Here too the leading figures have experience in leading a team and technical knowledge of workplace management in such areas as tenancy administration, property management and logistic services (Becker, 1990). Similarly, an emerging Management Consulting culture is becoming essential to the survival of the service professions to think holistically, creatively and flexibly through chaotic environments (Gibson, Jones, Robinson & Smart, 1995).

THE IMPACT OF CULTURE

Empowerment requires the creation of a strong corporate culture which both encourages staff at all levels to feel they can make a difference and helps them acquire the confidence and skills to do so. Hirst (1992) and Simmons & Teare (1993) suggest that a commitment to service quality improvement requires the development of a "service-driven culture", or a "total quality culture", based on approaches to professional development which ensure greater employee empowerment, customer focus and continuous improvement. Culture and status play a big part in traditional Chinese firms. The concern of "losing face", by making a wrong decision, is so strong that no decision is often made.

Culture is to do with human values and behaviour. It has an element of thinking about TQM (Batten, 1994). Managers must be concerned with the culture of their organizations. There are activities generally described as a part of a TQM effort that directly lead to creating a cultural change.These characteristics as outlined in the Malcolm Baldrige Criteria include: (a) participative management and openness, supported by encouraging employee involvement, empowerment, the use of teams, education and training and extensive communication; (b) a rational approach by fact based decision making, clear mission, objectives, statistical tools and statistical process control, evaluation and improvement cycles, etc.;(c) flexibility with customer focus, continuous improvement and (d) integrity with emphasis on customer values, public responsibility.

As the business market becomes more globalised, as individual managers become more mobile and firms more international, so some convergence towards new globally defined professions might be expected. Traditionally a handful of largely Western countries have determined the state of the world economy and the way in which business is transacted. Hong Kong draws slightly on cultural traditions which are different from those of the Western countries and which have influenced their business practices. So, a new management style might emerge, one which will influence the new rules of business. Thus, despite convergence in professional practices, no blame culture, encouraging accountability and responsibility, may be important in determining from where manager in service market will emerge.

EFFECTIVE QUALITY TRAINING CURRICULUM

A joint study conducted by Developmental Dimensions International and the Quality and Productivity Management Association revealed that training is an integral and essential part of the TQM initiative. Executives and managers know that employees must be trained if they are to understand the concept of quality and to master the use of empowerment management (Svenson & Riderer, 1992).

Organisations that achieve success in quality related training efforts provide effective training in four stages. The first stage, *conceptual training*, exposes employees to the concept of quality and the impact it can have on an organisation, with relevant examples based on experience. Its effectiveness is greatly enhanced when it is followed up immediately with specific plans and changes in organisational systems that focus on the prevention of problems and on continually delighting customers by means of customer satisfaction measurement. Concept courses involve TQM Philosophies; Customer-Focused Organisation; Company Approach to Quality and Customer Satisfaction.

The second stage, *quality tools training*, provides the basic tools and training on how to apply them in the work environment. Employees should be given sufficient time to practise the skills they are being taught by hands-on experimentation with quality tools, such as data collection, histograms, cause and effect, graphs and pie charts. Quality tools courses consist of Team Leader Skills; Systematic Problem-Solving Model; Cause Analysis; Measuring Performance; Deciding on Solution / Process Improvements.

The third stage, *leadership training*, is aimed at executives and managers who lead the initiative. Managers who have completed leadership training need ongoing feedback to determine how successfully they are implementing the new management techniques. Leadership courses involve Strategic Quality Planning; Executive Leadership and TQM; Leading an Empowered Workforce; Building a High Performance Organisation: Issues and Options.

The fourth stage of training, *special topics*, addresses topics and aspects of quality specific to job functions. Special topics should be tailored to train employees in the right areas and paths for particular functions and levels of employees. Special topics courses consist of Information Technology; Benchmarking; Business Process Re-engeneering; ISO 9000; ISO 14000; ISO 18000; Quality Function Deployment; Empowerment Management; Malcolm Baldrige Award Criteria; TQM in Support Functions; Measuring Customer Satisfaction.

CONCLUSIONS

To sum up, TQM programmes that do not have management commitment and employee empowerment are bound to fail. Managers believe that, with top management commitment, by involving employee in problem solving, decision-making, and business operations, then performance and productivity will increase.

Even though Hong Kong has started empowering some employees with mixed success, it has not been perceived as a viable management style in Hong Kong for some considerable time. The reasons given for this can be due to a lack of perceived need, lack of understanding, lack of trust, lack of an open supportive company culture and Asian cultural inferences. In order to achieve any form of empowerment management, managers need to be committed and take employee suggestions and opinions seriously.

To be able to participate to empowerment, employees need to be sufficiently educated. Furthermore, the local education system is teacher centred, which leads to low initiative, enthusiasm, and self-confidence. The educational environment is not creating people who eagerly participate. The authoritarian style of management, which prevails in local companies, also hampers any form of participation of the employees. With supportive management and training empowerment does work in some selected property services companies. Employees should be encouraged to control their destiny and participate in the processes of the organisation. To be effective, employees should be given power, information, knowledge and rewards that are relevant to business performance.

TQM calls for a change of culture with the support of management that requires employee empowerment for quality improvement at all levels. Empowerment also leads to greater levels of satisfaction among the workforce whereas empowered employees give faster and friendlier service to customers as well. There is a significant, positive relationship between success with organisational process improvement and the presence of all three cultural elements related to quality improvement: customer focus, employee empowerment and continuous improvement.

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ASSESSMENT AND PREPARATION OF CAREER AND TECHNICAL EDUCATION TEACHERS: IMPLICATIONS FOR CURRICULUM DEVELOPMENT

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Index: Vocational education; teacher preparation; career and technical teacher education; curriculum development; alternative teacher education; teacher quality.

Abstract: The study was designed to determine the preparedness of a cohort of career and technical teachers to meet the requirements of the contemporary classroom. Using the field-based, competency-based alternative teacher education model operated by Temple University, it was determined that Temple University's career and technical education teachers felt well prepared to meet the challenges of the contemporary classroom. It was also evident that there were both similarities and differences in how teachers in academic disciplines and teachers in career and technical fields perceived their readiness to teach the next generation of students. Indicators in the study further suggest that there may be identifiable pedagogical competencies that could provide a framework for developing the curriculum for career and technical teacher education.

INTRODUCTION

In the next ten years the US educational system will educate 53 million young people and hire 2.2 million teachers (Riley, 1999). Several measures have been initiated at the national and state levels to meet this challenge. President Clinton proposed spending $128 million to improve the quality of teaching through the training of teachers to integrate technology into the classroom (White House, 2000). The US Congress also passed the appropriations act for fiscal year 2000 and re-authorized the elementary and secondary education act that will begin to address the quality of teaching in the public schools (US Congress, 1999). In order to provide an insight into how reform could be achieved in teacher preparation, the US Department of Education (USDE) examined and reported on the quality of teacher preparation in the US public schools (USDE, 1999).

In the Commonwealth of Pennsylvania, similar concerns prompted Governor Ridge to unveil a program that will provide an alternative route to teacher certification (Pennsylvania Department of Education, 1999). Following the initiative of the state administration, the Pennsylvania State Board of Education adopted changes to the governing rules for teacher preparation and qualification that will enable the State to meet the needs of the contemporary classrooms (Pennsylvania State Board of Education, 1998). In addition, Pennsylvania initiated a unique partnership program that brought together Microsoft Corporation and State agencies to train and certify the Commonwealth's teachers in cutting-edge technology for the classroom (Pennsylvania Department of Education, 1998).

The goal of the various measures is to ensure that there is a talented and well-prepared teacher in every classroom (USDE, 1998). Despite these efforts, some educators and government administrators are concerned about the preparedness of teachers to meet the needs of the 21st Century classroom (American Federation of Teachers, 2000; Riley, 2000).

Background

Educating the next generation of students and new teachers will weigh heavily on teachers presently in the workforce, and teacher education will assume a more significant role in developing teachers to meet the challenges of the classroom. However, in a study of teacher quality in the public schools - its preparation and qualifications - the USDE noted that less than half of public school teachers felt very well prepared to meet the challenges in the public school classroom (USDE, 1999). The study focused on teachers with academic assignments but did not reflect the perceptions of teachers who teach career and technical education subjects. Consequently, there was the felt need for a similar study that focused on career and technical education teachers, and a pilot study was designed for that purpose, using the career and technical teacher education program model of Temple University.

In addition to the traditional four-year campus-based approach, Temple University has utilized an alternative approach to prepare career and technical teachers for more than a quarter of a Century (Adamsky and Cotrell, 1975). The program is a field-based, competency-based model in which pedagogical experiences are provided to beginning career and technical teachers who enter secondary school classrooms directly from business and industry. The program is delivered off-campus through regional centers and individualized on-site helping conferences provided by Temple University teacher educators. To achieve program objectives, multiple teaching resources are employed, including individualized professional education plans, instructional modules and high-technology instructional media. The program enables teacher preparation to have a direct and immediate impact on career and technical students (Wash et al., 2000). It maintains a regular assessment schedule at various stages of delivery, with the overall goal to improve career and technical teacher education and its impact on career and technical education students (Hatfield and Gorman, 2000; Wise and Liebrand, 2000). The program, thus, provides a framework for examining the preparation of career and technical education teachers, and the present study was designed for that purpose.

The purpose of the study

The purpose of this pilot study was twofold. It was designed a) to determine if a cohort of Pennsylvania career and technical teachers felt well prepared to meet the challenges of contemporary classrooms, and b) to examine the perceptions of graduates of an alternative career and technical teacher preparation program operated by Temple University against the perceptions of conventionally prepared general education teachers. The expectations were that, collecting this information would contribute to a discussion about program enhancements as well as the need for comprehensive studies of career and technical teachers in Pennsylvania and the United States.

Methods

Participants

All participants in the study were practicing career and technical education teachers prepared through Temple University's field-based, competency-based alternative teacher education program. All had received Pennsylvania's Career and Technical Instructional Level II Certificate between 1990 and 1998, and all were certified in trade and industrial education subjects. One hundred and fifty-two teachers were identified in eastern Pennsylvania public schools.

Instrument

A survey questionnaire was developed, using information from the USDE's report on teacher quality and Temple University's field-based, alternative teacher education program. The questionnaire was divided into four sections relating to 1) situational data, 2) teacher education program characteristics, 3) program contribution to teacher preparation, and 4) perceived teacher preparedness. Sections 2, 3 and 4 of the instrument were designed to collect data on a six-point Likert scale.

Data collection and Analysis

One hundred and fifty-two questionnaires were mailed to practicing career and technical education teachers identified in eastern Pennsylvania, and 34 or 22.37 percent responses were returned. A test of the data for non-respondent bias yielded a Pearson correlation coefficient of .91 ($r = .91$, $p \leq 01$), thus, confirming that the respondents adequately represented the population. The Statistical Package for Social Sciences (SPSS 4.1) was used to analyze the data, using descriptive statistical techniques and factor analytical techniques. A factor analysis of the variables resulted in 9 factors that formed the basis for discussing the implications of the findings. (See Table 1).

Table 1: Teacher Preparation Program: Factor Components and Related Elements

Components	Elements
• Academic preparation	Coursework, basic academic skills, and clinical experience
• Curriculum and performance standards	Development, evaluation, implementation and utilization
• Diversity in the classroom	Working with students with diverse needs and backgrounds
• Learning environment	Access, facilities and resources
• Occupational competency	Professional knowledge and occupational skills
• Professional development	In-service staff development activities, workshops, academies, and professional conferences
• Support systems	Peer collaboration, administration's encouragement, community involvement, parents' participation and teacher networks,
• Teaching methods and skills	Planning strategies, delivery strategies, classroom management skills, student performance evaluation skills, and reflective teaching skills
• Technology	Evaluation, selection, and integration.

Findings

The key findings are summarized under four categories: situational data, teacher education program characteristics, curriculum contribution to teacher preparation, and teachers' perceived preparedness.

Situational data

The findings indicated that a little more than 88 percent or 30/34 of career and technical teachers worked in their occupational fields for 5 years or more before making the career change to teaching. A little more than 44 percent or 15/34 of career and technical teachers held a 4-year college bachelor's degree or higher, and nearly all career and technical teachers, 97 percent or 33/34, taught subjects in the occupational field in which they were certified.

Teacher education program characteristics

The data analysis indicated that Temple University's career and technical teacher education program was designed to address all the components identified in a factor analysis and summarized in

Table 1

Program contribution to teacher preparation

- A very large number of career and technical teachers, 82.4 percent or 28/34, reported that their academic coursework contributed very much to their teacher preparation.
- A large number of career and technical teachers, 77.4 percent or 24/31, indicated that the use of state or school district curriculum contributed much to their teacher preparation.
- A very large number of career and technical teachers, 84.8 percent or 28/33, indicated that understanding the need to support students with disabilities contributed very much to their teacher preparation. Similarly, a large number of career and technical teachers, 64.0 percent or 16/25, reported that understanding the need to support students with culturally diverse backgrounds contributed somewhat to their teacher preparation.
- Nearly 90.0 percent or 30/34 of career and technical teachers reported that the learning environment contributed very much to their preparation for teaching.
- The vast majority, 93.7 percent or 30/32, of career and technical teachers reported that having an in-depth knowledge of their occupation contributed very much to their preparation for teaching.
- A little more than one-half, 52.9 percent or 18/34, of career and technical teachers reported that professional development activities contributed very much to their preparation to teach.
- A large number, 76.5 percent or 26/34, of career and technical teachers reported that all forms of support systems contributed very much to their preparation to teach.
- Nearly all career and technical teachers, 94.1 percent or 32/34, reported that the knowledge of effective teaching strategies contributed very much to their preparation for teaching.
- A large majority, 72.7 percent or 24/33, of career and technical teachers reported that the integration of educational technology into their curriculum contributed very much to their preparation for teaching.

Perceived teacher preparedness

- Nearly three-fourths of career and technical teachers, 73.5 percent or 25/34, reported that they felt well prepared or very well prepared to continue with academic coursework.

- A large majority, 78.8 percent or 26/33, of career and technical teachers reported feeling well prepared or very well prepared to implement state or school district curriculum and performance standards.
- A little more than one-half, 52.9 percent or 18/34, of career and technical teachers indicated that they felt well prepared or very well prepared to support the instructional technology needs of students with disabilities. However, only 38.2 percent or 13/34, of career and technical teachers reported feeling well prepared or very well prepared to serve the needs of students with limited proficiency in English.
- All career and technical teachers, 100 percent or 34/34, reported that they felt well prepared or very well prepared to provide instruction in their subject area.
- A large number, 69.7 percent or 23/33, of career and technical teachers indicated feeling well prepared or very well prepared to continue with professional development activities.
- Only 43.8 percent or 14/32 of career and technical teachers reported feeling well prepared or very well prepared to assist other teachers integrate computer technology into their curriculum.
- Nearly all career and technical teachers, 97.0 percent or 32/33, reported feeling well prepared or very well prepared to deliver instruction utilizing effective teaching methods and strategies.
- A little more than three-fourths, 76.5 percent or 26/34, of career and technical teachers reported feeling well prepared or very well prepared to integrate educational technology into their curriculum. However, only 21.6 percent or 6/28 indicated feeling very well prepared to employ innovative technologies such as the Internet and multimedia programs in delivering instruction.

The study found that there were similarities and differences in how teachers in academic disciplines and teachers in career and technical subjects perceived their preparedness to meet the demands of the contemporary classroom. Compared to 99 percent of teachers in academic disciplines, only 44 percent of teachers in career and technical education hold a 4-year college degree, baccalaureate or higher. However, compared to 97 percent of career and technical teachers, only 79 percent of English teachers, or 78 percent of mathematics teachers, or 89 percent of social studies/social science teachers teach the subject they are certified to teach. The following table summarizes differences in teachers' perceived readiness to implement program requirements in the classroom.

Table 2. Summary of Differences in Perceptions between Academic Teachers and Career and Technical Teachers about Teacher Preparedness for the Contemporary Classroom

	Percentage of Teachers	Well Prepared
Area of Preparation	Academic	Career and Technical
Integrating educational technology into instruction	20	76
Integrating new technologies such as the Internet into instruction	20	21
Meeting the needs of students with limited English proficiency	20	38
Supporting students with special needs such as disabilities	20	53
Using performance assessment instruments to evaluate students	28	43
Implementing new teaching methods and strategies	41	97
Implementing state or school district curriculum and performance standards	36	79

Conclusions

Four conclusions were made from indicators in the study. First, the findings indicated that career and technical education teachers felt well prepared to meet the needs of the contemporary classroom. Second, the findings indicated that certain program attributes facilitate teacher preparation and need to be included in career and technical teachers' curriculum. Third, career and technical education teachers need professional development in certain program aspects to enhance their competencies. Four, there are differences and similarities in how teachers in academic disciplines and career and technical education perceive their preparedness for the challenges of the contemporary classroom.

Implications for teacher preparation

Indicators in this pilot study provide several lessons for career and technical teacher preparation and curriculum development. First, the indicators provide an insight into what teachers think about their preparation and what makes teacher preparation effective. Second, while a large number of career and technical teachers have indicated that they felt well prepared to meet students' needs in the emerging classrooms, the data indicate that there are still specific areas of concerns that need to be addressed, if teachers were to realize their full potential. In program areas such as technology integration, support for students with special needs or diverse backgrounds, and employing assessment and evaluation tools, career and technical teachers would benefit from staff development activities. Indicators in the study may well suggest that the identified program attributes provide a framework for curriculum development in career and technical teacher education (See Appendix A).

Recommendations

Based on the preceding discussions, the following recommendations are made for future study.

1. A study should be conducted that examines the contribution of specific program components to the effectiveness of career and technical teacher preparation.
2. All participants in the study were certified in trade and industrial disciplines. Future studies should include teachers in other subject areas in career and technical education in order to provide a broader insight into teacher preparation in career and technical education.
3. This study was limited in scope and depth because of the small number of participants and it is recommended that the study is replicated with a larger population.

Summary

Several million young people will be educated in the US in the next few decades and teacher preparation is key in meeting the needs of teachers for the next generation of students. A study by the US Department of Education provided an insight into the preparation and qualifications of teachers in the academic disciplines in the public schools, and thus, gave us a rationale for developing teachers in the academic disciplines for the contemporary classroom. However, the study left out career and technical education teachers. Therefore, the present study focused on teachers in career and technical education and found that teachers prepared through the alternative education program at Temple University felt well prepared to meet the challenges of the contemporary classroom. The study provided an insight into what career and technical education teachers perceived as contributing factors to their preparation to teach, and thus, gave us a protocol that may be considered in the design of career and technical teacher education curriculum.

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APPENDIX

Appendix A: A Framework for Developing Career and Technical Teacher Education Curriculum

Curriculum Component	Component Elements
Academic preparation	• Coursework • Basic academic skills • Clinical experience
Curriculum and performance standards	• Development • Evaluation • Implementation • Utilization
Diversity in the classroom	• Working with students with diverse needs • Working with students with diverse backgrounds
Learning environment	• Access • Facilities • Resources
Occupational competency	• Professional knowledge • Occupational skill
Professional development	• In-service staff development activities • Workshops • Seminars and academies • Professional conferences
Support systems	• Peer collaboration • Teacher networks • Administrative encouragement • Community involvement • Parents' participation
Teaching methods and skills	• Planning strategies • Delivery strategies • Classroom management skills • Student performance evaluation skills • Reflective teaching skills
Technology	• Evaluation • Selection • Integration

WHAT'S HAPPENING IN YOUR TEACHER EDUCATION PROGRAM?

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Index: Teacher Education; Program Examination; "Generative" leadership, Planning framework, Research framework, Program VITAL

Abstract: Six questions are presented, the answers to which will enable program administrators to gain valuable insights to their current or proposed teacher education program. Consideration of program aspects as perceived by participants at all levels can assist in the planning of appropriate interventions to mitigate complications. The questions were used in a recent study of the alternative vocational teacher education program at Temple University, known as VITAL. Responses to the questions revealed a cluster of themes that converged to form a concept identified as "generative" leadership. Generative leadership appears to be a major influence in the success of that program. Program developers will find that considering these six questions will facilitate the planning of an effective and successful teacher education program.

INTRODUCTION

Questions for Program Administrators:

> What are your program goals?
> How would you describe your attitude toward your program?
> How does the structure of your program affect its coherence?
> How is research employed in your program?
> How do you arrange for passage through your program?
> What expectations do you have of your program participants?

Many questions beset program developers as they pursue the initiation or revision of a teacher education program. To produce an effective program, developers should have some degree of predictability as to how participants at all levels might function in the system. One may ask how this important information can be obtained? A recent inquiry into vocational teacher education programming reveals that six simple questions can produce surprising insights.

While program developers consider many things when initiating a new venture, program administrators can review past performance to project future trends and possible program revision. Employing the six questions in the planning phase can enhance aspects of an existing situation and identify potential pitfalls in a future endeavor. Obviously, answers to the questions for a potential program must be of an anticipatory nature. Using the questions as a basis for a planning framework can assist developers in the identification of a desirable result. They can then move forward to design suitable interventions to achieve that outcome.

Disclosures, some of which may be surprising, can be of great assistance to program administrators and developers as they strive to achieve program success. Answers to the six questions can be gathered from a variety of sources. In a study of Temple University's Program VITAL (Vocational Intern Teaching/Applied Learning), five research questions were designed to elicit oral and written views of program aspects (Howey & Zimpher, 1989). However, as past and present program participants discussed roles and experiences, repeated themes converged to pose the possibility of yet another question worthy of consideration. Indications are that the use of the six questions in a planning and/or research framework can be the key to successful modification of an existing program or an aid in the development of a new program.

The categories of goals, attitudes, structure, research, and passage represent the initial five questions. Disparate responses from the original work exemplify the variety of responses and illustrate the range of perceptions on the part of individuals in all levels of a program hierarchy.

Goals

Question One. How do participants describe the goals, expectations, or outcomes of the program?

The response from a program administrator was succinct and straightforward, "The goal is to offer each learner an individualized program having flexibility in delivery, but the outcome is teacher competence." However, some students offered these comments, "I need a clear understanding of what is expected." And "There is a complete breakdown of communication."

Attitudes

Question Two. How do participants express their attitude and identification with the program?

One administrator stated "It is challenging to constantly train new teachers, but it is part of being dedicated to one's profession." But some students commented, "I just wanted to get it over with."

Structure

Question Three. How do participants describe the structure and coherence of the program?

Program framers described the program as "A closed loop, based on validated competencies." Some students saw it as "Confusing."

Research

Question Four. How do participants perceive external and internal research in the program?

Administrators see external research as "A means to keep the program current." One student saw it as, "One more thing to throw at us." Staff members saw internal research as ". . . providing needed information." However, some students tried to manipulate the process with remarks such as, "My instructor is unfair."

Passage

Question Five. How do participants view their place in the program?

Program developers see the passage as,"A process to assist students in their transition to educators." Some students commented, "Every time I turn around, something changes."

Commentary

Obviously, the selected responses represent extremes. However, arbitrary comments during conversations revealed unanticipated perspectives within the program being examined. For example, early in the study, one fact that could not be ignored was that views formulated over time. Also, evidence of planned intervention to facilitate positive impressions began to emerge. It became evident that positive personal characteristics permeated the program in thought and action. As the study progressed, those characteristics which appeared at first to be individual, i.e., altruism, vision, dedication, and persistence, blended to form a sixth concept that is identified as "generative" leadership. Thus, we have one more descriptor:

Generative Leadership

Question Six. How do participants manifest generative leadership?

The notion of generative leadership began to unfold with comments such as this from one administrator, "It's my job to provide renewed energy and move people on." This is reinforced by the words of one student, "The most valuable thing was the care and direction that made me comfortable forming and expressing my own views."

DISCUSSION

The research introduces the phenomenon of generative leadership and emphasizes its influence in program planning, revision, and development. Evidence indicates that generative leadership is self-renewing, inspiring participants to move forward and motivate those in all directions of the hierarchy (Heberley, 1999). Clearly, it is advantageous to employ a philosophy that is multidirectional and comprises specific attributes such as the desire to be an agent of change, the acceptance of challenge, the allocation of time, and attention to ongoing research. These characteristics combined with those listed earlier, make generative leadership is a winning stratagem for any program. How does it come into being? In the program studied, the originators were highly motivated, and cognizant of the importance of imbuing participants with the shared vision. Those who followed have been able to carry on that vision and through careful planning, keep the phenomenon viable (Walker, 1997).

Why is this valuable to planners of new or revised programs? Generative leadership is not an accident. It is deliberate, planned, and properly executed. It generates enthusiasm, creativity, and promotes a positive work ethic. It produces an energy that is transmitted through the faculty to prospective teachers who go on to inspire their own students.

A primary benefit of generative leadership is the advancement of positive convictions in program participants. Secondly, participants and those who move on are infused with the ideology of self-renewal and revitalization. Its manifestation throughout the hierarchy of a program appears to be essential to the longevity and success of that program.

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STRESS MANAGEMENT FOR TEACHERS IN VOCATIONAL EDUCATION AND TRAINING SECTOR

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Index: Managing Change, Classroom Behaviours, Win/Win Solutions.

Abstract: Much of the stress of teaching is related to problem behaviour in the classrooms. The most effective way of managing behavioural problems is to prevent them from arising, and to minimize their occurrence. The focus is the teacher's ability and willingness to create a successful learning situation appropriate to the student's needs. Essentially, stress can be a challenging; exciting stimulus to personal growth, whilst excessive stress can prove damaging to psychological and physical health because it often triggers emotional and physical strain that may be harmful. So, people are motivated to cope with stress. However, the reactions to stress and its adaptive value vary from one person to the next and from time to time for the same person. Decisions about how to cope can consequently be complex. Thus, this paper will highlight some of the more adaptive stress coping strategies, with examples and cases drawn from the authour's experiences in teaching as well as from research towards secondary school teachers in Hong Kong.

INTRODUCTION

Occupation provides an important source of need satisfaction (Arnold, Robertson, and Cooper, 1993). For example, a job is attractive because of the external rewards it can bring from pay, grades, rewards, obligations and approval. In contrast, a person may be motivated intrinsically when his/her higher levels of needs are met, such as job activities which bring respect, admiration, allows for development of personal potential, competence or means of self-fulfillment. Job satisfaction is of great importance because it is an important domain of life that influence satisfaction (i.e. family, health, community, work and spare time activity etc.).

STRESS PERCEPTION AND COPING

Some experience of stress and anxiety is normal. Indeed, mild stress can actually be beneficial and produce alertness and interest. Some stress is invited, especially that which produces enjoyment and motivation in work and life (Selye, 1984). However, the level of stress one perceives varies greatly from one person to another (Carver, Weintraub and Scheier, 1989; Fontana, and Abouserie, 1993). If stress is not managed properly, it can damage performance. Prolonged stress and anxiety may lead to physical illnesses (Maslach and Jackson, 1993). Emerging problems and some adaptive coping strategies are discussed.

Classroom discipline, student violence and apathy. Most of problems raised by teachers are related to discipline or study problems of students. Problems appear more significant for academically low achieving students. Sometimes these problems manifest themselves as physical or verbal abuse, yet more often they present themselves as minor yet disruptive behaviour which, whilst not immediately challenging the authourity of the teachers, demand the expenditure of inordinate amounts of teacher time and energy. Some teachers may place the blame for behavioural and academic problems on the students' poor standard, inattentiveness and laziness. These teachers become defensive and irritated when confronted by students' misbehaviour, they find it difficult to look hard at themselves, their methods and attitudes. On the other hand, others will reflect and evaluate on their teaching practices to see if they have contributed to the observed problems. Kounin (1970) reported that there is no difference between more and less successful teachers in terms of effectiveness in dealing with behaviour problems, but successful teachers are seen to be far more adept at preventing them. Bull and Solity (1993) have outlined some of the constructive ways to deal with problem behaviours:

- Intervene as early as possible,
- Use the lowest level of intervention necessary, according to the misbehaviour and its effects on learning, relationships and safety,
- Keep the time and attention given to misbehaviours to a minimum,
- Handle misbehaviours in a firm and matter-of-fact way; avoid showing unwanted behaviour for the teacher himself,
- Once dealt with, misbehaviours should be treated as finished; any counselling should take place at other times,
- Use all corrections consistently and fairly,
- Take active steps to teach and maintain appropriate behaviours; use far more rewards than corrections,
- Use misbehaviours as pointers to improvements for one's classroom management.

Teachers find that misbehaved students are mostly under-achievers, they tend to have low self-concept, which often results in a lack of motivation for learning. They often feel insecure and alienated from school. These students respond to failure by focusing even more on their own inadequacy; their attitudes toward assignments may deteriorate even further (Ames, 1985). So, intervention of students' misbehaviour should be non-judgmental to prevent students from retaliating. Students should be guided to learn how to take responsibility of their own actions without the feelings of shame, humiliation and being ridiculed. Feedback also plays a crucial role for the student in defining his or her self-perception of ability. If the performance is satisfactory, future tasks are likely to be approached with confidence (Charlton and David, 1994). Consequently, classroom events shall be tackled systematically and consistently so that students will learn to behave in a desirable manner and be rewarded for doing so. Where behaviour problems arise in schools, it may be difficult to determine or explain precisely why students behave as they do, as behaviours are affected by a whole range of variables, usually in combination. For example, expectations from teachers, parents and the students themselves can be influential. They will reflect the ways in which students predict their own performance level and shape their achievement orientation, actual performance and attribution for success (Yee, 1992). Self-expectation is learned as it depends on previous experiences. It is, in part, influenced by teachers, parents and others, who signal their expectations through their interactions with individuals. Students with learning difficulties tend to have low self-esteem and low expectations of themselves. If expectations from teachers and parents are unrealistic, students may precipitate fears and anxieties within them which cause untold misery and unhappiness, then motivation to learn is lost. However, over permissiveness may also create anxieties, as students may require boundaries or guidelines within which they can act and feel secure (Clarizio and McCoy, 1983).

Demand on Time. One of the most frequently cited work-related stress factors is the demand on time. The excessive paperwork duties takes time away from teaching duties. The stress engendered by paperwork is almost certainly related to teachers' perceptions of a lack of professional respect accorded them. Time spent on paperwork is not just inconvenient but is an additional burden on top of an already too busy day. Good time management helps teachers to manage the ever-increasing level and complexity of work demands. Basically, it involves managing oneself and others(Covey, 1989). Teachers are found to achieve satisfaction from their work differently which has an impact on time management. For instances, some teachers consider task satisfaction to stem from carrying out work to a higher standard than other teachers. Not surprisingly, these teachers found it hard to delegate. Similarly, some teachers were only satisfied if the work was as near to perfection as possible. Likewise, these teachers have found it hard to meet deadlines. Still, there are teachers whose social satisfaction comes from solicitous care of students. They may be too keen to offer help to students and others, which take away times for essential tasks. Inability to manage time effectively may cause inconvenience to others, the institution will lose its efficiency. Furthermore, extended working hours will be detrimental to the personal life of the individual. More importantly, it may lead to important tasks being neglected in favour of urgent ones. The enemy of the "best" is often the "good." So, one must keep in mind to be able to say "no" to something if it is not to the apparent, urgent things in life.

In essence, effective time management is putting first things first (Covey, Merrill, and Merrill, 1999). In the essay "The Common Denominator of Success" written by E.M. Gray, that the successful person has the habit of doing the things Failures don't like to do, they don't like doing them either necessarily. But their disliking is subordinated to the strength of their purpose (Covey, 1989). Drucker (1954) explained that effective people are not problem-minded, they are opportunity-minded. They feed opportunity and starve problems. They think preventively. They have genuine crises and emergencies that require their immediate attention, but the number is comparatively small because they constantly strike a balance and keep focus on the important, but not urgent, high leverage capacity-building activities. As a consequence, one's effectiveness would increase dramatically. The crises and problems would shrink to manageable proportions because of one's actions in thinking ahead, working on the roots, doing the preventive things that keep situations from developing into crises in the first place.

Furthermore, effective time management requires organization, planning, prioritising, communication, trust and discipline. Plans must be reviewed and adapted in the light of opportunities or difficulties in response to the needs and wants of individuals, families or to possibilities that open up as a result of new developments. Covey (1989) suggested six important criteria to the organisation of time. The first is coherence. Coherence suggests that there is harmony, unity, and integrity between one's vision and mission, roles and goals (both short- and long-term), priorities and plans, desires and discipline. The second is balance. Balance is a tool to keep balance in one's life so that the individual will not neglect important areas such as health, family, professional preparation, or personal development. Covey (1989) stressed that many people seem to think that success in one area can compensate for failure in other areas of life, but can it really? "Perhaps it can for a limited time in some areas. But can success in your profession compensate for a broken marriage, ruined health, or weakness in personal character? True effectiveness requires balance" (p.161). The third is focus. It is a tool that encourages, motivates and actually helps a person spend the time dealing with prevention rather than prioritising crises. The fourth is people. One would need a tool that deals effective with people, not just schedules. It is focused on effective, synergistic interaction with people. The paradigm is people first, things second. It is leadership first, management second. It is effectiveness first, efficiency second. It is purpose first, structure second. It is vision first, method second. The fifth is flexibility. The planning tool should be the servant instead of one's master. The plan should be tailored to one's own style, needs and particular ways. Finally, the tool should be portable so that it can be carried with the person most of the time within reach and to facilitate constant reviewing.

Teachers have always worked under pressure and for many, today's pressures outweigh their ability to cope with them, resulting in stress related symptoms. In terms of health-related behaviour, when people are under stress, they often do not take proper care of themselves. For example, teachers reported that they frequently take students' assignments and exam papers home to mark. They may skip meals or snack on junk food. People under stress cease normal exercise routines and become sedentary. These behaviours may impact upon the immune system and so reduce the body's ability to fight disease. This behaviour may also affect the general functioning of the body and may contribute to the development of illness. If stress are 'bottled up' for long periods, there are risks of psychosomatic symptoms such as headaches, stomach upsets, nervousness, sleep disturbances, depression, fatigue, high blood pressure and skin disorders as reported by many stressed teachers (Cole and Walker, 1989; Travers and Coopers, 1990). Thus, stress may indirectly affect health by reducing positive health behaviours and increasing negative ones.

Managing Stress through Exercising. People who have made concerted efforts to improve their physical health and well-being have made great differences to their ability to manage effectively whilst those who do not wish they have addressed the issue earlier. Exercise generates more energy than it uses. Professor Steptoe and his colleagues (The Health Promotion Research Trust, 1989) have found that normal adults benefit psychologically from regular physical activities. Moderate exercise schedule, about 20 minutes of vigorous rhythmic exercise three or four times a week, is enough to reduce tension and anxiety, clear up mental confusion and improves ability to cope with stress. The reason is that although the heart is a muscle, it cannot be exercised directly. It can only exercise through the large muscle groups, particularly the leg muscles. That's why exercises like rapid walking, running, biking, swimming, cross-country skiing, and jogging are so beneficial.

Coping with the pace of change. The second factor raised by teachers is the demands as a result of frequent changes in social, technological and educational policies. On the positive end, it has revolutionize communications, video technology creates new teaching techniques and provides an analytical tool to fasten improvement. On the downside, they make current knowledge, skills and values obsolete. They need to take extra time to learn new concepts and techniques, revise curriculum from time to time and subsequently all the notes, worksheets and activities to cater for the changes. Additionally, there are related meetings and paper works associated with proposed changes. Change scares some people because it often begins with feelings of disequilibrium, incompetence and discomfort (Whitaker, 1995). This dissonance leads to a drive to restore equilibrium. Possible consequences are that they reject, suppress and distort their perceptions of reality rather than face the inevitable stress of handling it. So, the major obstacle to the implementation of new policies, goals or methods of operation is the resistance of people to change. Resistance to change comes in two forms—systematic and behavioural (Plant, 1987). Systematic resistance tends to occur when there is a lack of knowledge, information, skill and managerial capacity. Behavioural resistance is more emotionally centred and derives from the reactions, perceptions and assumptions of individuals and groups in the organisation. Lack of trust, for example, is much more difficult to manage than lack of information or the lack of resources. It is suggested that in order to reduce the resistance, the managers should increase participants' levels of involvement and information, listen to the experience of those involved in change and seek to understand what is felt to be threatened. The managers need to be deeply caring and concerned about what it is that staff feel they are having to give up and to be seen as an ally and not as an opponent in the change process. Much pain and discomfort can be avoided if these ideas can be incorporated in the values and assumptions that underpin approaches to management and leadership. A great deal of stress within organisation staff can be traced back to insensitive and clumsy handling of innovation and change.

Relations with others. The third factor reported by teachers is connected with interpersonal relationships with their students, co-workers or superiors. There are different believes that teachers hold regarding their relations with students. Some teachers believed that teachers should be more authouritative and always keep a distance from the students if they are to effectively manage class discipline. This group of teachers appears to experience frequent confrontations with students (Ormrod, 1995). In comparison, some teachers have adopted a more permissive style, although when necessary, will adopt an authouritative approach. Teachers who adopt a more democratic approach report good student/teacher relationship. In schools where the culture is highly Power oriented facilitates the existence of office politics. Lack of recognition for good teaching, lack of participation in decision-making and a lack of friendly atmosphere among staff characterise the climate in those schools. In this circumstances, if a large reserve of trust is not sustained by continuing deposits, relations between people will deteriorate. Instead of rich, spontaneous understanding and communication, the situation becomes one of accommodations, where people attempt to work independent lifestyle in a fairly tolerant way. The relationship may further deteriorate to one of hostility and defensiveness. The "fight or flight" response creates verbal battles, slammed doors, refusal to talk, emotional withdrawal and self-pity which end up in cold war, endless confess of the sins of one another and a loss/loss political battle. But there really is no quick fix. Building relationships are long-term investments and repairing relationships takes time.

To act effectively in interpersonal contexts, there is a need to develop an understanding of the various forces that affect the ways in which groups of people work together in order to develop an awareness of the options in choosing how to behave towards each other. The development of interpersonal skills involves looking inwards (Covey, 1989). This presupposes that until one can understand oneself, the individual will have difficulties in improving one's relations with others. Requisite qualities are: communication skills, cooperative skills and interpersonal skills. Qualities such as personal warmth and an ability and willingness to project a genuine interest in others, the ability to promote the owning and sharing of personal ideas and feelings with appropriate others, and being receptive to the need of others to do the same are also important. A 'good' interpersonal climate is one that is relatively free of power differentials, competition and unfavourable comparison of one individual with another. However, this is not the usual institutional climate as highlighted by teachers in many educational settings (Dunham, 1992). Teachers who have perceived a lack of personal control as a result of the authourity structure feel helpless and are afraid that their efforts to cope will lead to failure, embarrassment and signs of inadequacies. This in turn leaves them with feelings of uncomfortable about not being able to reciprocate, or with the belief that his or her personal control is limited by it. This helps to explain why this group of teachers have reported severe stress level even though they have used a number of constructive stress coping techniques whilst others working in similar environment have reported comparatively less stressful.

Conflicts in teaching philosophy. Finally, the tension in the work of teaching is cast in terms of conflicting teaching philosophy and institutional demands (Feiman, and Floden, 1986). From the perspective of the teachers, teaching includes all those aspects directly related to the realization of educational goals: motivating students to learn, assessing knowledge, getting to know them as individuals, etc. Teaching is a balanced system in which all components support and align to each other. Imbalance in the system will lead to a breakdown to poor teaching and surface learning. Non-alignment is signified by inconsistencies, unmet expectations and practices that contradict what a teacher preaches. Many teachers reported that traditional transmission theories of teaching ignore alignment. The common assessment method of determining students' academic achievement is to compare their performance to each other ('norm-referenced'), rather than on whether an individual's learning meets the objectives ('criterion-referenced'). They criticised that school administration and policies from local education authourity always dominate the professionalism of teachers. The assessment criteria fails to project inherent relations between what is taught and what are tested Brown and Knight (1995). They also voiced constraints due to some administrative requirements and resource limitations that make alignment difficult, for example, summative assessment in the form of tests and examinations are often used to discriminate and filter students for promotion to higher education which encourage surface approach to learning.

CONCLUSION

Job dissatisfaction may produce reactions which are detrimental to the individuals as well as to the organization's aims and objectives (Arnold, Robertson and Cooper, 1993; Edworthy, 2000). If feelings of being anxious are slight, teachers may experience a sense of stimulation and alertness which is pleasurable rather than stressful. Excessive demands may initiate the arousal of higher levels of anxiety. These may be unproductive in the sense that a teacher's ability to make decisions is impaired or the ability to concentrate is reduced. There may be a sharp loss to confidence in teaching. Therefore, the identification of stress in relation to job satisfaction and the way teachers cope with stress is the central theme of this paper. To conclude, on the one hand, teachers are restricted by the institutional climate, the rules and procedures set by administrators, that they have to follow as best as they may. As to the classroom climate, that is more under their control. Most serious problem behaviours demand more time, energy and greater expertise than lesser ones, it seems more sensible, wherever practicable, to prevent problems arising, or less serious ones escalating. In addition, it is also important that the wanted behaviour should be rewarded consistently, firmly and fairly over time. The kind of atmosphere they create --authouritative, democratic, permissive, open, cold and warm -- can remarkably affect the effectiveness of a teaching approach. All aspects of teaching are mutually supportive, each is an integral part of the total system, not an add-on. To align constructively, it is part of the teachers' role to reflect on their present skills and their style in order to analyze and remedy weaknesses for themselves and identify and build upon strengths. Spoon-feeding does the work for the students, so that they have little left to do but obediently swallow.

It is fair that everyone, no matter he is rich or poor, has 24 hours in a day, so, it depends on how efficiently and wisely one can in the use of time. No one can extend the length of life time for an hour more, however, one can adjust the breadth to make it more enriching and fulfilling. People who make efforts to adapt become more resilient to the stresses and strains and they can fight off infections more easily. People who make efforts to change their lifestyles, such as eating the right kinds of foods, getting sufficient rest and relaxation, and exercising on a regular basis, are seen to be more healthy. But individuals who ignore their lifestyles are likely to experience ill health.

Finally, one of the most identifiable constraints affecting teachers' choices of coping strategies is perception of their ability to control. People's perceptions can be vastly different. They have lived with their paradigms for years, thinking they are "facts", and some of them may even question the character or the mental competence of anyone who cannot see the facts. So, if a teacher is very frustrated because his superior is locked into what he feels is an unproductive leadership style, how can he/she transcends the limits of his/her perceptions so that he/she can deeply communicate, and cooperatively deal with the issues and come up with Win/Win solutions? The deepest hunger of the human heart is to be understood. Seeking to understand requires consideration whilst seeking to be understood takes courage. In order to strive for a Win/Win situation, it requires a high degree of both qualities. The essence of achieving synergy is to value differences--to respect them, to build on strengths, to compensate for weaknesses (Covey, Merrill, and Merrill, 1999).

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MINING LABOUR MARKET INFORMATION FOR USE IN DEVELOPING AN IT MANPOWER PREDICTIVE MODEL

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Index: Data Mining, Artificial Neural Network, Statistical and Mathematical Technique, Labour Market Information, Manpower Predictive Model

Abstract: To improve the information content of the data and to empower knowledge workers of today and tomorrow, the latest "hot" technologies that have emerged on the client/server arena are focused on filtering unnecessary data and presenting the valuable information in a user-friendly, intuitive, and easy to understand way. One of these technologies is data mining. This paper will highlight the significant of discovering meaningful new correlations, patterns, and trends by digging into (mining) large amounts of labour market information (LMI) stored in databases, using artificial-intelligence (AI) and statistical and mathematical techniques. For experimental purpose, a manpower predictive model will be built upon the LMI to forecast the manpower requirement of the IT sector. The IT manpower predictive model is essential for planners in business, government and academia to derive an appropriate vocational education and training plan to meet the needs of the industry.

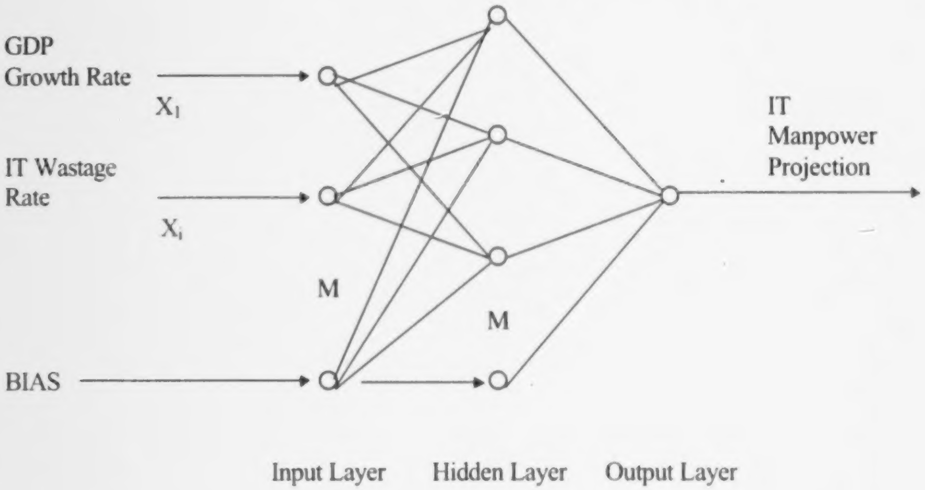
INTRODUCTION

How does data mining work? It isn't magic. Instead it works the same way a human being does. It uses historical information (experience) to learn. However, in order for the data mining technology to pull the "gold" out of your database, you do have to tell it what the gold looks like (i.e., what business problem you would like to solve). It then uses the description of that "gold" to look for similar examples in the database and uses these pieces of information from the past to develop a predictive model of what will happen in the future.

As IT is a rapidly changing and developing field, an accurate manpower predictive model is required for vocational training and educational planning purposes. Since it takes a number of years to educate and train people for the IT jobs, the industry needs must be anticipated sufficiently far in advance to allow time for that training. Failure to anticipate the needs and to develop the required high level IT manpower may seriously impede economic progress.

This paper demonstrates on how to develop a manpower predictive model using feed-forward artificial neural network (ANN) (as shown in Figure A) by going through the process of data analysis, parameters setting, and model training and testing. The historical information (such as IT vacancy rate, IT wastage rate, unemployment rate, emigrant growth rate, GDP growth rate, wages/earnings growth rate, consumer price index, and labour force participation rate) which might have an influence on the IT manpower requirement will be used for developing the predictive model.

Figure A Feed-Forward Artificial Neural Network



ARTIFICIAL NEURAL NETWORKS (ANNs) MODEL

ANNs are often represented as automated data mining techniques. While they are very powerful at building predictive models, they do require significant data preprocessing and a good understanding and definition of the predictive target. Usually normalizing predictor values between 0.0 and 1.0 and converting categorical to numeric values is required. The networks themselves also require the setting of numerous parameters that determine how the neural network is to be constructed (e.g., the number of hidden nodes).

An effective modeling tool (that discovers relationships from a database of examples) can generate a compact module that captures from simple linear to complex, non-linear relationships in a form that is readily executable. It excels at modeling systems such as fuzzy estimation, probabilities, expert experience and judgment, process sensor measurements and control strategies.

Experiments

Setting

The following procedures will guide us through a demonstration of modeling tool's capabilities on creating a data matrix of historical LMI and a number of predictive models based on the initial setting of training parameters.

Entering the Dataset

In order to create an ANN model, it is necessary to load the dataset into the modeling tool. Importing is one method to fill in the data matrix (ODBC.DM) required to build the model.

Factors/variables displayed as columns are presented in a spreadsheet format with socio-economic data collected by the Census and Statistics Department and the IT manpower data collected by the Vocational Training Council, and each observation from 1985 to 1997 in quarterly basis is displayed as row. The intent of the data capture is to see if any of the process factors/variables and performance indicators of the data matrix can be used appropriately for the development of manpower predictive model of the IT sector.

The parent data matrix can be apportioned into training and test matrices. The dataset from 1985 to 1994 (with total number of observations N = 40) is used to train the ANN model. Other portion of parent data matrix from 1995 to 1997 (with total number of observations N = 12) is reserved for testing the accuracy of the trained model by considering the difference between measured and predicted outputs or the model error. The column (factor/variable) names of the data matrix are described in Table A.

Table A Factors/Variables of the Data Matrix (ODBC.DM)

Column (Factor/Variable) Name of the Data Matrix	Column (Factor/Variable) Description
IT/LABR	IT manpower as a % of total labour force
IT-GRW	IT manpower growth rate
IT-WTG	IT manpower wastage rate
IT-VAC	IT manpower vacancy rate
IT/ESTAB	Average No. of IT manpower per establishment
PC-GRW	Terminals/PCs/Workstations/Servers growth rate
SYS-GRW	Computer System (mainframes, mini-computers, super-micros) growth rate
NET-INST	% rate of installation with network
GDP-GRW	GDP growth rate
IMP-GRW	Imports quarterly quantum index growth rate
EXP-GRW	Domestic exports quarterly quantum index growth rate
REEXP-GR	Re-exports quarterly quantum index growth rate
TOTEXP-G	Total exports quarterly quantum index growth rate
LABR-GRW	Labour force growth rate
EMP-GRW	Total employment growth rate
UMEMPLOY	Unemployment rate
UNDEREMP	Under employment rate
MANU-EAN	Earnings growth rate by manufacturing sector
SERV-EAN	Earnings growth rate by services sector
CPI(A)GR	Consumer Price Index (A) growth rate
CPI(B)GR	Consumer Price Index (B) growth rate
CPI(C)GR	Consumer Price Index (C) growth rate
CCPI-GR	Composite Consumer Price Index growth rate
EMIG-GRW	Emigrant growth rate
TOTAL-MP	Total IT manpower requirement

Data Analysis

After the dataset has been loaded into the modeling tool, the data matrix is checked to see that only good data has been imported. Outliners, typing mistakes and scaling problems may be seen statistically or graphically as shown below.

Basic Statistics

Statistics report which gives an overall picture of the data matrix (ODBC.DM) is shown in Table B.

Table B Basic Statistics of the ODBC.DM

Factor/Variable	N	Mean	Std Dev	Minimum	Maximum	Sum Sq
IT/LABR	52	0.013154	0.004633	0.006000	0.020000	0.684000
IT-GRW	52	0.134923	0.107106	0.042000	0.371000	7.016000
IT-WTG	52	0.090058	0.045007	0.039000	0.178000	4.683000
IT-VAC	52	0.066192	0.014343	0.045000	0.086000	3.442000
IT/ESTAB	52	0.261538	0.156974	0.070000	0.590000	13.600000
PC-GRW	52	0.581308	0.543715	0.025000	2.605000	30.228000
SYS-GRW	52	0.087827	0.023062	0.062000	0.134000	4.567000
NET-INST	52	0.461500	0.175080	0.220000	0.693000	23.998000
GDP-GRW	52	0.057269	0.040625	-0.029000	0.177000	2.978000
IMP-GRW	52	0.149058	0.096678	-0.041000	0.362000	7.751000
EXP-GRW	52	0.024019	0.093322	-0.103000	0.270000	1.249000
REEXP-GR	52	0.219212	0.141061	-0.055000	0.500000	11.399000
TOTEXP-G	52	0.143808	0.095161	-0.025000	0.371000	7.478000
LABR-GRW	52	0.016404	0.015731	-0.015000	0.059000	0.853000
EMP-GRW	52	0.017769	0.016794	-0.012000	0.062000	0.924000
UNEMPLOY	52	0.022500	0.006160	0.013000	0.035000	1.170000
UNDEREMP	52	0.014212	0.005207	0.006000	0.025000	0.739000
MANU-EAN	52	0.038481	0.036497	-0.057000	0.135000	2.001000
SERV-EAN	52	0.044481	0.024125	-0.020000	0.088000	2.313000
CPI(A)GR	52	0.074885	0.026806	0.025000	0.131000	3.894000
CPI(B)GR	52	0.075962	0.025667	0.029000	0.124000	3.950000
CPI(C)GR	52	0.083538	0.024770	0.034000	0.122000	4.344000
CCPI-GR	52	0.077500	0.025461	0.031000	0.123000	4.030000
EMIG-GRW	52	0.077788	0.230971	-0.300000	0.579000	4.045000
TOTAL-MP	52	25620.750	12186.646	9378.0000	44847.000	1332279.0

Model Building

In order to derive an appropriate ANN model for the IT manpower forecast, it is necessary to study a number of trained ANN models using different number of hidden neurons from 1 to 9. Other initial parameters controlling the way on how the modeling tool trained on the pattern data are set up as follows:

Max Hidden:	(from 1 to 19)	Learning Rate:	0.75	Seed: 15
Eon:	100	HLearning Rate:	0.75	
Max Training:	200,000	TLearning Rate	0.75	
Hidden Freeze:	0.75	IO Learning Rate	0.75	
Error Tolerance:	1.e-003	Alpha:	0.8	
Good RSQ:	0.9999	Theta:	0.5	
Sign Inc:	5.e-002	Random Fact:	0.5	
Tolerance:	5.e-002	Auto Save:	1,000	

Models Analysis

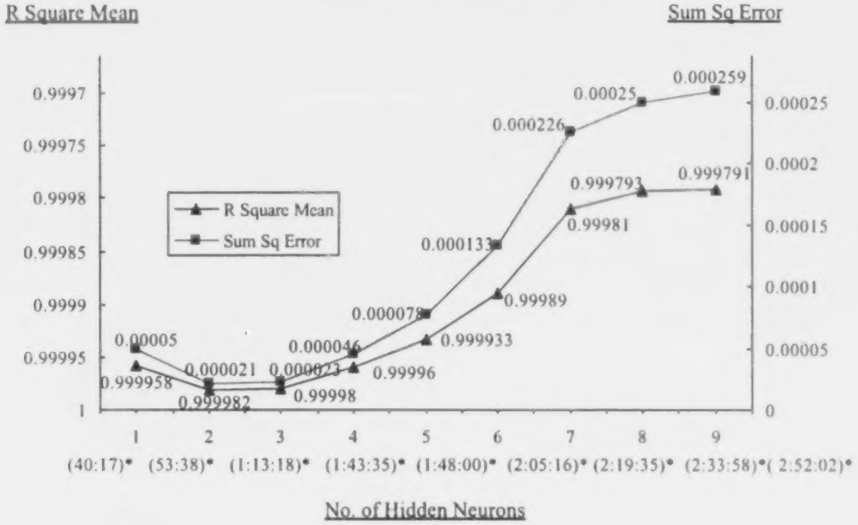
The application of the modeling tool provides two basic methods for analyzing trained models. The first is a numerical or statistical method and the second is a graphical method. Both of these methods can be used on either the training matrix or the test matrix. Also, additional test matrices can easily be imported for analyzing long-term performance.

ANN models have been created and trained on the basis of automatic increment of hidden neurons (by setting the maximum number of hidden neurons from 1 to 9). In this respect, it is necessary to find out the performance of each of these ANN models by including or excluding factors/variables from the input list of the model based on prior knowledge. The performance of all these ANN models are validated by checking the predicted outputs statistically and graphically as shown in the following experimental results:

Result I - Models Performance Analysis based on the Number of Hidden Neurons

Figure B below shows the performance analysis of 9 well-trained NN models. All these models each have the R square mean close to 1.0 and the sum square error close to zero. It is observed that the hidden neuron's learning rate decreases when adding a new neuron in the Automatic Increment training algorithm. This results in the increase of training time in accordance with the addition of hidden neurons as shown in figures in brackets.

Figure B Models Performance Analysis based on Number of Hidden Neurons



* Figures in brackets denote the time taken in hh:mm:ss to train the neural models after 200,000 times the training matrix has been presented before ending the training.

In comparison, it is observed that the model with 2 hidden neurons (with sum square error of 0.000021 and R square mean of 0.999982) performed better than the other models. In order to improve the performance of the ANN model with 2 hidden neurons for projecting IT manpower requirement, further analysis of its factors/variables for inclusion into the input list of the model is essential.

Result II - Sensitivity Analysis of the Output of the Trained Model (with 2 Hidden Neurons) on the Training and Test Matrices

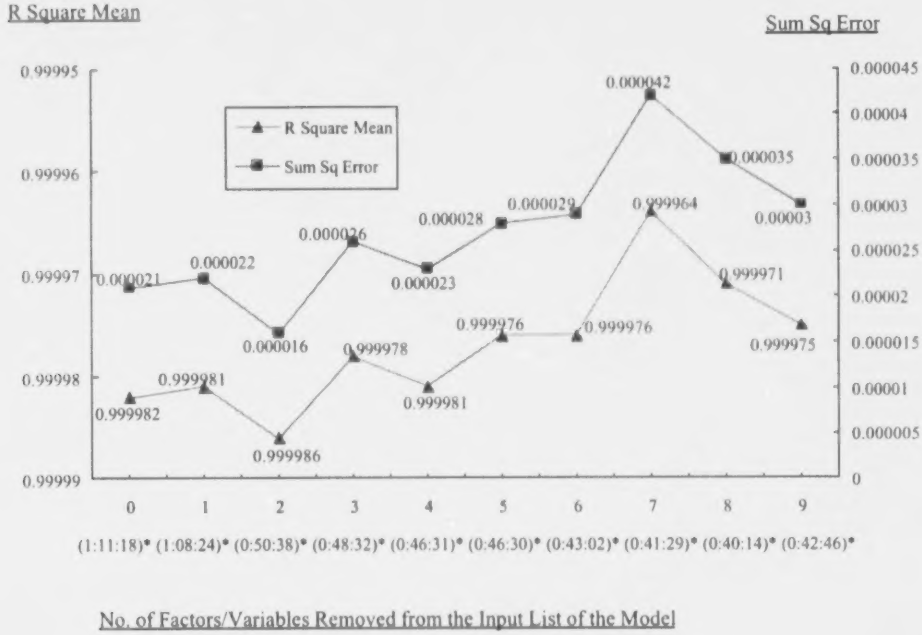
A sensitivity analysis is run to see which factors/variables account for most of the variability of total IT manpower requirement (TOTAL-MP) of the trained model with 2 hidden neurons on the training and test matrices. The result is ranked in order with factors/variables of the most effect at the top of the list as shown in Table C.

Table C Sensitivity Analysis of the Output (TOTAL-MP) of the Trained Model with 2 Hidden Neurons on the Training and Test Matrices

Variable Name	AveAbs Sens	Ave Sens	Peak Sens
NET-INST	0.18175	+0.18175	+0.08609
IT-WTG	0.18055	-0.18055	+0.08944
SYS-GRW	0.09439	-0.09439	+0.03850
IT-VAC	0.07946	+0.07946	+0.04372
CPI(B)GR	0.06373	+0.06373	+0.03104
CCPI-GR	0.05160	-0.05160	+0.03065
CPI(C)GR	0.04370	+0.04022	+0.03096
IT/LABR	0.03570	+0.03570	+0.01722
CPI(A)GR	0.03529	-0.03527	+0.02433
EMIG-GRW	0.03246	-0.03246	+0.02093
IT-GRW	0.02958	+0.02958	+0.01631
REEXP-GR	0.02605	-0.02589	+0.01792
GDP-GRW	0.02274	-0.02207	+0.01392
EMP-GRW	0.02226	-0.02226	+0.01152
EXP-GRW	0.01544	+0.00868	+0.01081
PC-GRW	0.01239	+0.01193	+0.00795
SERV-EAN	0.01218	-0.01218	+0.00698
LABR-GRW	0.01122	+0.01122	+0.00586
IMP-GRW	0.01089	+0.00346	+0.00820
MANU-EAN	0.01002	+0.00990	+0.00630
UNDEREMP	0.00887	-0.00283	+0.00739
TOTEXP-G	0.00771	+0.00754	+0.00667
IT/ESTAB	0.00743	+0.00387	+0.00649
UNEMPLOY	0.00460	-0.00460	+0.00219

In order to pick the best factors/variables for inclusion into the input list of the model with 2 hidden neurons, the last 9 factors/variables of the sensitivity analysis report are each removed one by one from the input list to form different models for further training and analysis. The performance of these 9 trained ANN models based on various input factors/variables on the training matrix is shown in Figure D.

Figure D **Models Performance (with 2 Hidden Neurons) based on Various Input Factors/Variables on the Training Matrix**



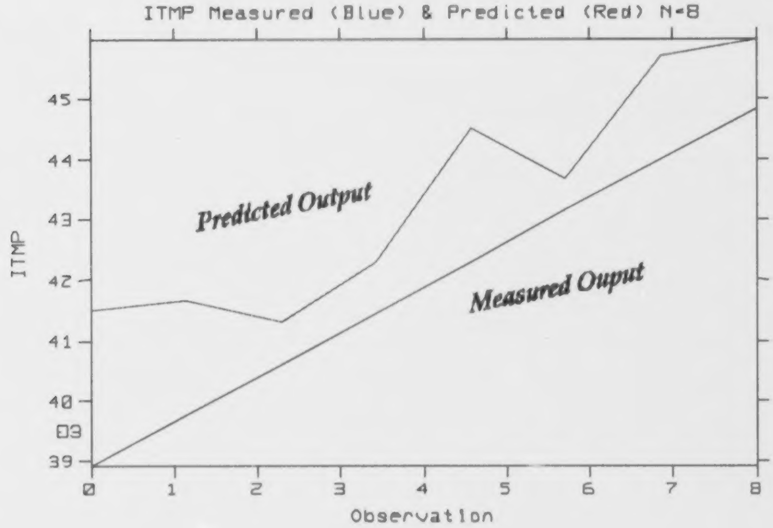
* Figures in brackets denote the time taken in hh:mm:ss to train the neural models after 200,000 times the training matrix has been presented before ending the training.

The resulting graphical display enable us to quickly determine how well all these trained models performed on the training matrix. It is observed that these trained models each have the sum square error close to zero and the R square mean statistic larger than 0.9999 (near 1.0) of the good RSQ training parameter. Among these, model with 2 factors/variables (i.e. IT/ESTAB and UNDEREMP) removed from the input list performed the best (with R square mean 0.999986 and sum square error 0.000016). It is also observed that in general the time taken to train each model is inversely proportional to the number of factors/variables removed from the input list of the model.

Result III – Keep Best ANN Model During Training

Sometimes the best model of a particular process develops somewhere between the first few seconds of training and the maximum epoch allowed. The modeling tool can keep this intermediate model developed during the training session as the final model by selecting either the mean square error or R square as the measurement. A measured and predicted graph with best performance on the test matrix is shown in Figure E.

Figure E **Measured and Predicted Outputs of the Model (with 2 Hidden Neurons) on the Test Matrix having 2 Factors/Variables Removed**



CONCLUSION

Findings of the Project

Feed forward neural networks with a single hidden layer are statistically consistent estimators of arbitrary measurable, regression functions under certain practically-satisfactorily assumptions regarding target noise, number of hidden units, size of weights, and form of hidden-unit activation function (White, 1990). Unfortunately, the above consistent results depend on one impractical assumption that the networks are trained by an error minimization technique that comes arbitrarily close to the global minimum. Such minimization is computationally intractable except in small or simple problems (Judd, 1990).

ANNs do provide powerful predictive models and theoretically are more general than other data mining and standard statistical techniques. In practice, however, the gains in accuracy over other techniques are often quite small and can be dwarfed by some of the costs because of careless construction or use of the model by non-experts.

Further Development of the ANN Model

When standard neural networks are used to solve problem in projecting IT manpower requirement which relied on complex labour market information, the deficiency of the network architectures become apparent. (i.e. Brute-force learning is time-consuming and the performance is usually poor.) It is suggested that if the problem is sufficiently partitioned by job level (such as IT management, systems development and operative), standard neural networks can be used as building blocks (or functional units) in the construction of a more complicated neural structure. Each of these functional units is responsible for solving a portion of the problem by job level. This, of course, will ease the learning process and improve the accuracy of the functional units. On the other hand, the partitioning scheme depends very much on the designer's knowledge of the problem concerned. These include identified appropriate learning factors/variables by job level for each of the corresponding functional units. Once such scheme is identified, the resulting neural network would consist of an intelligence that is in-built by the designer, and the output of each functional unit would aggregate to form the total IT manpower requirement. This is the core idea of neural intelligence.

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TRAINING FOR BETTERMENT: A MODEL FOR TRAINING OF PROFESSIONALS IN A DIVERSE ORGANISATION

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Abstract: Staff development is one of the pillars of organisational advancement. A well-trained employee has the capacity to increase the organisational output and improve his/her individual social capacity. The conventional method of staff development trains each tier of decision-makers for their particular skill needs. The problem with this model is that capital gain and financial results might be the only mutual outcome of these training.

The proposed model sees the staff as individuals who might have similar needs and interests towards certain philosophical and cultural views holding the organisation together. The model, already in practice in one of the Pacific Island countries, shows how one might find a common interest in the organisation and how the staff might be trained within the parameter of this undertaking.

INTRODUCTION

The structure of the organisation is a guide to define the work practice, allocate duties and coordinate work. The structure helps to understand the division of the labour, how decision making being made and how the communication between the players take place.

Organisational structure usually take the various shapes but they are generally look like a pyramid with many workers at the lower levels, fewer at the middle and still a fewer one at the top. Decision making and communication channels are indicated by the structure, showing who makes decisions, who will carry out these decisions and how these decisions are communicated to various levels of the organisation. However the height of the organisation and level of hierarchy is not uniform in all organisations. There are those which might become flat as the result of less number of operational levels and those with multiple operations that make up the tall organisation.

In summary organisational structure indicates the level of function and the communication process in which an organisation operates. In all, the process of decision making is generally at the top level with a few organisations having their decision made at bottom of the ladder.

Staff Development

Staff development is one of the pillars of organisational advancement. The impetus for an organisational success, might be argued, depends on the skills and know how of the workforce. A well trained workforce not only has the capacity to increase the organisational output, at least in a short term, but increases social benefit at both individual and community levels. For organisations to succeed a great deal of inputs, financial or otherwise, are invested in the setting up and conducting staff development programmes.

Approaches to the staff development in many organisations has been geared towards training of each tier of decision-makers in their particular job related skill and needs. This traditional and conventional practice treats the development of individuals as separate from the development of the organisation in which they work (Darling-Hammond, 1990). The top managers receive their training in areas of organisational re-structuring, management skills and similar topics. Down the ladder the next tier is trained in means and ways of managing various departments and finally those dealing with the day to day contacts with the public are taught how to deal and satisfy customers demands on their routine and daily customer relationships. The problem with this model is that beside the outcome such as capital gain and financial results there are hardly any other common interest resulting from these capacity buildings. Furthermore, the staff development service has little or no involvement of the clients and those who will be the recipient of these training. In many of these development programmes, staff are asked to reflect on aspects of their work for a better understanding of the individual worker leading towards future efforts which might be handled more effectively. Although such approach might be proven to be effective in individual learning (Warren-Little, 1990) it is still questionable where they are sufficient in improving organisational development and interest (Wood, Thompson, & Russell, 1981).

Clearly what is needed then is a model of staff development which not only facilitate individual learning and improvement of quality of individual work practices but one which support and facilitates organisational development at the same time. Such a model of staff development will need to go beyond transmission and development of staff know how to a model of mutual and shared visions and common interest.

The process

The process starts with engaging all stakeholders in defining organisational needs, beyond personal interest and individual work practices. This means a need assessment, searching for organisational vision, within the context of organisational overall vision, goals and mission. Beyond this point is turning these common understudying and visions into a staff development policy that encourages common interests and mutual vision and interests. Such an action plan looks at individual staff at micro level and assists them to develop the knowledge and skills necessary to excel in their work and designated tasks. It also insist in development of staff activities towards group work and team building by drawing upon the individual and collective vision of staff at meso level. Finally the plan will assist the organisation to develop a strong and coherent framework to support and encourage the realisation of the mutual vision at macro level (Marshall, SJ, 1998).

The Case Study

Yooroang Garang: School of Indigenous Health Studies was invited to develop "...a fully costed plan...for the development of the Information, Education, and Communication [IEC] Unit" [later Solomon Islands Centre for Health Promotion {SIHPC}] by the Human Development Sector Unit-East Asia and Pacific Region of the World Bank in late June 1999.. The final Action Plan was to be implemented in two provinces of Makira and Guadalacanal (Clapham, 1999, p.1).

Three members of the Yooroang Garang visited Solomon Islands in the first week of June 1999. The team started the task by visiting, discussing and interviewing relevant personnel throughout their stay in Solomon Islands. Such needs assessment was followed by one of the team members visit to a community health centre; interviewing members of Malaria, Maternity Care and STD team, discussing the needs of the unit with Non-Government Organisation [NGO] management and attended a one day NGO seminar in Honiara. Ministry of Health and Medical Services [MHMS] and World Health Organisation (WHO) in Solomon Islands provided the team with valuable information, data, reports and necessary documents.

A preliminary analysis of the current situation in Solomon Islands health system indicated a number of important factors, which undermines the ability of health care in Solomon Islands (Clapham, KhavarpOour, Gelonesi, 1999). Shortage of trained health personnel, shortage of medical equipment, high population growth and financial strains are a few highlighted in the review of health system in 1996 (Solomon Islands Ministry of Health and Medical Services, 1996). But a vibrant and engaging system of collaboration was evident and is still functioning in many parts of the organisations in the Solomon Islands. The presence of a large contingency of Non Government Organisations [NGO's] and similar institutions in the islands indicated a high level of activities among these groups. From the interviews and discussions with various groups it was evident that collaboration and engagement in mutual goals and objectives were also taking place at national, provincial and local levels. These were the strength of the Solomon Islands community that needed nurturing and developing.

To engage in this community building process the development of "horizontal" rather than the "vertical" ties between the government institutions, NGOs at local, state and national level was paramount to the success of any initiative, health or otherwise. However, these engagements needed to be focused and directed towards mutual interests and outcomes. Participation in these mutual engagements, and in this particular case those engaged in health promotion initiatives, required specific skills and training, which were missing at many levels.

Such specific need which was mutually recognised by all at various levels, was the health promotion (see Figure 1). However, the needs of each level for health promotion training varied as their responsibilities differed. The top-level decision-makers required training in the meaning and concept of health promotion. The second tier of decision-makers were more in need of learning how collaborative efforts might influence health promotional activities at local levels. The workers, at lower level of decision making, had interest in developing skills in designing health promotion programmes, implementing them in earnest and evaluate the outcome. Based on these findings and using Bloom's The Cognitive Domain Taxonomy of Educational Objectives a Plan of Action was initiated (Bloom, 1956).

The Outcome

The Plan has now moved to implementation stage. After receiving conformation from the World Bank and Solomon Islands' Ministry of Health and Medical Services for the Plan and allocation of funding a number of development has taken place.

The training of the 2nd tier staff is now under way. Three of the staff from the new SIHPC are now attending Yooroang Garang programmes, one at undergraduate and the other two at postgraduate levels. Their curriculums are geared towards reorganisation and restructuring of the SIHPC. In addition to the foreshadowed training in policy development [see Figure 1] they are looking into areas of programme development and strategic planning.

Funds are now made available by the University of Sydney's International Development Fund to train 3-4 of the top management and Head of the NGO's [1st tier] to attend a three days workshop at Yooroang Garang in November-December 2000.

Meanwhile, the 3rd tier training needs will be served through various training, arranged by the three students attending classes at Yooroang Garang.

Figure 1

Developing staffs' individual and organisational needs

Bloom's Concepts	Meaning	Who	Application/training needs
Evaluation	• Judgments on values and purposes	**1st tier** • Top General Managers • Department Heads • Head of the NGO organisations • Solon Islands Centre for Health Promotion team	• To approve health promotion policies, • To approve funding for health promotion activities.
Synthesis Analysis	• Ability to put together elements/parts to form a whole • Ability to breakdown elements/parts to understand the relationships	**2nd tier** • Managers • Team leaders • NGO representatives • HEO's at Malaria, Maternal care and, STD	• To develop policies in health promotion • To advocate health promotion policies
Application Comprehension Knowledge	• Ability to use abstracts in concrete situations • Ability to recall methods/processes • Ability to recall patterns	**3rd tier** • Local HEO's at provincial level • Staff working/involved in health promotion activities	• To design, implement and evaluate health promotion programmes

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E-LEARNING IN KNOWLEDGE-BASED SOCIETY

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Index Words: E-Learning, Internet, Edutainment, New Learning Paradigm, Knowledge-based Society, (CLC) Continuous Learning Centre.

Abstract: The new training technologies can help improve the quality of the teaching and learning process, reduce training time and costs and compensate for the lack of training opportunities. One of the most prominent technologies is the development of Internet - leading to the development of e-learning. In the knowledge-based society, training stresses on individual learning and innovation to meet the restructuring of the industry. The Continuous Learning Centre (CLC) has demonstrated the success of the Internet learning and has been a pioneer in this area in Hong Kong. The experience and future development of CLC will be shared in this paper.

Knowledge-based Society

Evolution of economy

1. The evolution of economy from the dominance of Agriculture to Industry and to Information has developed social values and created wealth for human being. In the past, career relevant education starts with first formal academic degree and last until or beyond retirement. Nowadays, the rapid change in both employment patterns and society has made undergraduate education seem less important in the span of working life while Continuous Learning has become increasingly important. The future lives in a knowledge-based economy in which the amount of knowledge and our capacity to store and retrieve it is ever increasing, but the period for which particular pieces of knowledge are relevant or valuable is decreasing. Continuous Learning is partly an answer to the knowledge explosion, but even more as a facilitator of career change as old industries diminish and new ones grow. Continuous Learning is the necessary part in maintaining the growth and making progress in society. It should be in a form of systematic maintenance, improvement and broadening of relevant knowledge and skills. The development of these qualities is necessary for the successful carrying out of professional duties throughout a career. The Continuous Learning includes any activity that extends or updates knowledge, skill and judgement and enables knowledge workers to be more productive, understand and apply advances in technology, face changes in career direction and better serve the community.

New Challenges of Learning

2. Training is used to emphasize on mass teaching of production skills, which meets the needs of the high growth of industry in the past. Nowadays training stresses on individual learning and innovation to meet the restructuring of the industry. The paradigm of education shifts not only from skills to innovation, but also in many dimensions such as, from passive to active, from one way to interactive, from mass to individual, from standardized to diversified etc. On top of these, people would prefer to learn anytime anywhere convenient to them.

3. Companies and ogranisations must continuously and quickly train and update the skills of their employees to keep pace with the changes in the knowledge-based society. Traditional classroom training methods simply cannot keep up with the vastly increased speed and flexibility needed to meet training and education requirements for businesses running on Internet Time. Classroom training is expensive and organisations are under pressure to lower training costs by more efficiently delivering training.

New technologies used for learning

4. In the fast changing world, the intelligent use of new technologies plays a vital role in providing knowledge and skills to re-train and upgrade workforce so that they can adapt to evolving job opportunities and economic restructuring. The new training technologies can help improve the quality of the teaching and learning process, reduce training time and costs and compensate for the lack of training opportunities. One of the most prominent technologies is the development of Internet in recent years. Indeed the Internet is contributing to major transformations in the way people live, learn, work and interact around the world. Virtual workplace, virtual classroom, virtual library, virtual school and virtual community are becoming more pervasive.

5. In order to compensate the lack of training opportunities, one example is to make use of the satellite to broadcast the training to classrooms over the world. However, satellite broadcast is only one way. To complete the loop of interactivity, Internet can be used to send questions and video motion from each classroom equipped with Internet and camera. In turn, the questions asked be broadcast to every classroom through satellite so that every trainee knows who and what the questions asked.

E-learning

Definition of E-learning

6. E-learning provides and education opportunities that remove time, place and situational barriers. It can assume many forms but they all have common thread : the physical separation between a student and an instructor for most cases. E-learning is a knowledge and information infrastructure that leverages the power of the Internet to provide timely, effective training and education in an increasingly fast-paced and rapidly changing world. E-learning includes content delivery in multiple formats, management of the learning experience, and a networked community of learners, content developers and experts. It provides faster learning at reduced costs, increased access to learning, and clear accountability for all participants in the learning process.

Why e-learning

7. The driving forces of e-learning are many. First, more and more work can be done from home with PC and Internet links. According to the survey, about 30% of the companies in USA are set up at home. The figure is growing continuously. Second, people spend less time in travelling to attend class. They can do the learning anywhere. Third, Enterprises need to increase training opportunities to their employees while maintaining cost control. Fourth, the pace of innovation will be very rapid in the information world. Fifth, the business world is ever speeding up which requires rapidly transfer of knowledge and update skills. Sixth, the web server centralizes all contents of training titles, which are easily updated, customized and maintained. Seventh, the life long learning is becoming part of the life which is leading to a great demand in training and learning and eight,

traditional training class is too slow and cannot meet the overall demands in training. Lastly, Internet provide learning anywhere anytime. These driving forces unleash the e-learning.

8. In 1996, Internet training occupied less than 10% of total training requirements while Instructor-leaded training took up 80% of the pie. In 2000, it is forecast that Internet training and Instructor-leaded training takes 35% and 55% respectively. By 2002, traditional classroom training and e-training share equal training opportunities. According to Aberdeen Group study on e-learning in the enterprise, November 1999, already, more than 70% of corporations offer their employees computer or web-based training options. And 60% of institutions of higher education now offer online learning courses. Within a few years, that number should increase to 90% in corporate government, higher education settings. Tremendous growth is expected in the future of knowledge-based society.

Cons of e-learning

9. The increase in the popularity of e-learning in many corporations, governments, and higher education institutions are due to the fact that e-learning can be highly effective at teaching at much lower cost than traditional training. Technology cost decreases, high travel costs, flexibility are driving e-learning to proliferate. However, every coin has two sides. The drawbacks of e-learning include extra workload, lessened personal life, a lot of struggles, web limitation and high production cost.

Extra workload

10. Many instructors find E-learning courses often take more time to prepare and deliver than traditional classes. The extra workload is often not accompanied by any compensation. While this is being done on the good will of the instructor, that's not a solid foundation. Apart from all the IT/WEB/Multimedia skills to be grasped, one of the biggest parts of the work is the e-mail with students. In the classroom, there might be four or five eager students asking the questions. With an online course, there often are responses and questions almost from all students. For both the instructor and students, an online course is writing-intensive. All the coursework and feedback is given to students online. In a recent NEA survey (National Education Association of the United States – USA's largest teachers' union), 53% of the participants said on-line learning courses take more time to prepare for and deliver than traditional classes. 83% of the participants said they contact their students at least once a week by e-mail, and often communicate more frequently than that. All these take more time than traditional classes.

Probably one's personal life would be lessened

11. For the learner, perhaps the ultimate goal of lifetime learning is to improve one's quality of life. The anytime, anywhere nature of enterprise e-learning however blurs the line between work and after work. Though corporate competency could be increased by its employees' learning effort, probably one's leisure or personal life would be lessened.

Until its maturity, a lot of struggles and efforts

12. Technology is not a panacea and can only improve and increase learning when applied to meet specific educational goals and objectives. One key is to focus the use of technology on clear outcomes rather than allowing the tools of computers and Internet to become the ends. It takes time

to figuring out how to incorporate the technology into goal specific learning. E-learning is still in its evolution phase. Until its maturity, a lot of struggles and efforts would be needed.

The WEB limitation

13. The Internet today is slow and no speeds guarantee. PC is not reliable and the WEB is even more unreliable. One would find himself totally lost if the learning was disrupted by broken link or computer hang. On-line virtual classrooms with real-time audio and video could be very time wasting and frustrating if the learning was disrupted. Even for non-real-time self-paced learning that could tolerate the net, a lot of time could be wasted solely on waiting for information transferring through the net. Putting the learning materials on a CD ROM is often much better than delivering through the WEB.

High Production cost of courseware

14. The production of courseware requires both the skills of IT and the knowledge of the subject to be delivered. It is not easy to find such person especially the IT workforce is shortage. The cost of making such courseware is high yet the contents are not necessary effective and meeting the learning objectives.

Comparison of classroom and e-learning

15. Although the traditional classroom method is in many ways still the best way to train employees, it is generally slower than technological change. Although e-learning solutions allow enterprises to cut costs and improve training services for employees, and staff gain access to the latest training materials at their desktops when they need them, it is generally lack of interaction (face to face) and self motivation. In summary, the comparison of classroom and e-learning is tabulated as follows.

	Classroom	**E-learning**
Size of audience	Limited size of audience. Constrained by the training place	No limit of audience size. Increase training opportunities
Travel – overhead of training	Congregate trainer and students in one location. Expensive due to travel and lost opportunity costs	Virtual learning delivery eliminates travel expenses and minimizes lost opportunity costs
Flexibility	Constrain classroom and fixed time	Any where, anytime
Cost	High unit cost	High setup cost, low unit cost
Different level of trainees	Trainees are of different level of knowledge which impose difficulty in teaching	Trainees study the e-learning on their own pace
Access of experts	Difficult or expensive to get access to experts	Easy access to experts
Training contents	Generalised training	Personalized learning curricula
Fast pace	Difficult to keep training up to date	Rapid deployment and continuous evolution
Training on demand	Trainees are expected to absorb large quantities of information whether or not all information is relevant	Just-in-time modular training providing only necessary information
Interaction	Real life interaction (face to face) promote learning	Virtual interaction may not be attractive
Motivation	Trainer and class team motivate learning	Need self motivation which may end up with excuse of no time for training
Learning behaviour	Everybody gets used to classroom training	Need time to get accustom to e-learning

The operation of CLC

Establishment of CLC

16. The CLC was approved a grant of HK$3,202,000 for 3 years from July 1997 to July 2000 under the Industrial Support Fund (ISF) of Industrial Department. It is set up by the EDTTC in collaboration with the Electronic Engineering Department of the Hong Kong Technical College (Chai Wan) and Electrical & Communications Engineering department of the Technical College (Tsing Yi). The Centre was launch at 2 December 1998 and it was operated very successfully in the past years. The income of the CLC up to 15 July 2000 exceeds the original budget by 75%. The CLC is not only self financed but will continue to grow in the years to come.

Services of CLC

17. The Continuous Learning Centre offers 4 types of service. First, the course materials of the Electronic Design Technology Training can be accessed on the Web. Second, the Centre is equipped with interface software to realize CAD anywhere anytime on the Internet. The CAD service over Internet is the first of its kind offered in Hong Kong. It greatly improves the flexibility and convenience of practical learning such as real-time simulation. Third, the CLC provides interactive training courses with embedded tests on the Internet. Fourth, it provides library services of borrowing computer-based training and titles, which can be made reservation over the Internet. The establishment of the CLC is timely and rides on the wave of e-learning – Internet enabled

learning. By eliminating barriers of time, distance, and socio-economic status, individuals can now take charge of their own lifelong learning.

Combined Classroom and Internet Training

18. The Internet-based training provides knowledge in introductory level. Trainees acquire new concepts of new knowledge on his/her own pace. However, they may not easily master the know-how and application of knowledge through self-study. Classroom, group or mentor training with discussion and hands-on would compliment the Internet training to build up the in-depth skills and knowledge. Since Internet training is on self-pace, it brings trainees to the same level of basic knowledge before attending the class. Trainers immediately find that the audience are at similar level of knowledge, which allows them to conduct the class efficiently. The Internet training allows unlimited user access and reduces the cost of training per user. The classroom training could then concentrate on hands-on exercise, laboratory experiment, key point discussion, problem solving and professional examination preparation. The learning behaviour of the workforce nowadays may not get used to the learning through computer and always lack of motivation. Classroom training not only drives the trainees to study on Internet before coming to the class but also synchronise the learning progress. The e-learning and classroom training are of synergy with each other.

19. Because of the compliment advantages, the combined Internet and Classroom training is expected to be developed as one of the main stream of learning mode in the future. The iMCSE course launched by the Continuous Learning Centre of Vocational Training Council is the first of its kind in Hong Kong. It demonstrates both advantages of the Internet and Classroom training, which received encouraging response in the society.

20. The CLC established by the Vocational Training Council has demonstrated the success of the e-learning and has been leading the training industry in Hong Kong. Its four services of learning attract many engineers and technical supporting staff to participate in cyber training. The CLC is indeed riding on the wave of e-learning and its future development is full of opportunities.

Future Development

Opportunities of e-learning

21. In the knowledge-based society, as the demand of knowledge and training is ever increasing. It is forecast that the e-learning and business opportunities in development of e-learning will grow tremendously in the years to come. The CEO of Cisco Systems, John Chambers, declared in a 16 November 1999 keynote address to COMDEX that e-Commerce exploded over the past two years, the stage is now set for e-learning to become the second wave in Internet-based applications. According to a recent Merrill Lynch report, the education and training industry is a $706 billion market. The curriculum materials and certification segments of this market total $21 billion. These figures are for the United States only, but industry leaders expect the rush to prepare students for the Internet to be a worldwide phenomenon.

Future development of CLC

22. In today's fast-paced culture, organizations which implement e-learning will provide their work force with the ability to turn change and knowledge into an advantage and competitive edge. The next move of the CLC is to provide training to companies in setting up a company-wide e-learning infrastructure and in skills for creating e-learning component contents which are part of the value chain of a company's business.

CONCLUSION

23. The increase in the popularity of e-learning in many corporations, governments, and higher education institutions are due to the fact that e-learning can be highly effective at teaching at much lower cost than traditional training. Technology cost decreases, high travel costs, flexibility are driving e-learning to proliferate. However, the drawbacks of e-learning include extra workload, lessened personal life, a lot of struggles, web limitation and high production cost. The CLC has demonstrated the success of the e-learning with its four services. The future development of e-learning is full of opportunities.

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THE DEVELOPMENT OF A MANAGEMENT COMPETENCY MODEL AND A DEVELOPMENT CENTRE

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Index: Management Competency Model, Development Centre

Abstract: In 1999, the Hong Kong Productivity Council (HKPC) has developed a Hong Kong focused Management Competency Model and a Development Centre which aimed to improve the organisation's capability to develop managers for general management roles. The project began with the development of the Management Competency Model which formed the foundation of the Development Centre. The research process included surveys and focus group meetings. The Management Competency Model comprised 31 competencies grouped under 8 clusters. The assessment tools adequately measuring the competencies identified in the Model included personality questionnaire, 360 degree assessment exercise, group discussion on business case, role play, presentation, and interview.

INTRODUCTION

In 1999, the Hong Kong Productivity Council (HKPC) embarked on a research project in partnership with the Richard Ivey School of Business of the University of Western Ontario to develop a Management Competency Model and a Development Centre. The aim was to strengthen the human resources foundation of local businesses by improving the ability of companies to develop managers for general management roles.

OVERVIEW OF A DEVELOPMENT CENTRE

The purpose of a Development Centre is to measure the behaviour of a person in a structured way, enabling assessors to assess how competent the person is at present, or more usually, to predict the person's future behaviour. The Development Centre makes use of a multiple assessment approach with a multiple number of job-related exercises and activities by a multiple number of assessors on a multiple number of participants. It is designed to help participants learn more about themselves and can be used as a tool for team building and development of skill that will be called on in the future. With the incorporation of coaching and counselling sessions into the programme, they help develop people during the course of the Development Centre.

COMPETENCIES AS FOUNDATION OF THE DESIGN OF THE DEVELOPMENT CENTRE

In the context of designing a Development Centre, the start point is a clear and accurate picture of what the Centre is measuring so that participants are evaluated against appropriate criteria and the exercises are designed in a way that can accurately classify and evaluate behaviour. Therefore, competencies which are concerned with behaviour, attitudes, or skills, form the foundation of the design process.

RESEARCH PROCESS

The research began with the development of the Management Competency Model which was a multi-stage process described below:

In order to determine the competencies required, job analysis need to be carried out. The structure of a typical job analysis can vary, e.g. direct observation, interviews, critical incident technique, repertory grid analysis and questionnaires. In the case of this research project, behavioural questionnaires were adopted since interview with sufficient number of incumbents to obtain a representative sample of their views seemed impossible.

Before launching a survey to identify the core competencies required for successful performance, HKPC gathered the competencies associated with high performance from a number of sources. These included research from the Richard Ivey School of Business, HKPC, and the Human Resources managers from 14 sponsoring organisations, representing diverse industries from the private and public sector.

These competencies were consolidated and distilled into a list of 65 competencies and conceptually grouped into 12 dimensions. Altogether, 400 surveys were sent to the 14 participating organisations' Human Resources Managers and Line Managers on the relative importance of each of these 65 competencies to successful performance now and in the next 3 to 5 years. Survey respondents were middle to upper middle managers and their direct superiors. The aim was to produce a competency model that focused on the core competencies required for middle to upper middle managers with a general management responsibility.

Based on some data analysis, we generated a list of top 30 critical competencies. A number of focus group meetings were then held with the Human Resources Managers of the participating companies to review and validate the results. The outcome was that all the focus groups produced very similar lists.

FINDINGS - A MANAGEMENT COMPETENCY MODEL

Based on the above process, a Hong Kong specific competency model as shown in Table 1 was developed. It defined the critical competencies, skills and behaviours necessary for outstanding performance in general management roles in light of Hong Kong's unique future business challenges.

Table 1 The Management Competency Model

Menu	Cluster	Competency
Main	*1. Leadership*	Change leadership Directing Decision delegation Communication Job enrichment Change management Teamwork and cooperation Team sharing and learning Visioning
	2. Customer / Market Focus	Customer / market focus
	3. Decision Making	Decision making Decisiveness
	4. Intellectual Processing	Analytical thinking Creative thinking Problem solving
	5. Planningand coordinating	Coordinating Short-term planning Strategic planning Project management
Supplementary	*6. Performance Management*	Goal setting Performance assessment Developmental feedback
	7. Knowledge	Expertise management and development Organizational awareness Product / market sense Financial concern
	8. Personality Orientation	Achievement drive Adaptability Quality concern Perseverance Crisis management

The model comprised 31 competencies grouped under 8 clusters. These 8 clusters were further classified into 2 menus, i.e. a main menu consisting of 5 dimensions which all managers coming to the Centre should be evaluated on; and a supplementary menu consisting of another 3 dimensions considered as supplementary qualities which allow companies to assess, if a company wanted additional dimensions to be evaluated. The premise for separating "main" and "supplementary" menus was that there could only be a limited number of dimensions that can be reasonably assessed.

DESIGN OF THE DEVELOPMENT CENTRE

The content of a Development Centre consisted of a set of simulation exercises supplemented by various other ingredients such as interviews and psychometrics. In designing the Centre and selecting the exercises, we have considered a number of issues. For instance, the exercises selected should be of relevance to the job; the mix of exercises should be appropriate so that sufficient emphasis was given to the most important competencies; and the number of exercises should be minimised but was adequate to provide valid and reliable data due to time and resources constraints.

In order to gather the possible exercises which measured the competencies of the Management Competency model, a project team was formed. The first draft of a Competency - Exercise Matrix was produced. Then, the project team has conducted a trial run of the exercises in order to first, gauge whether the exercises were set a the right level of difficulty; second, assess whether the exercises were relevant; and third, check the timing of the exercises. After the trial, some of the exercises were edited, deleted and customised in some way. As a result, the Competency - Exercise Matrix was modified. The assessment tools included personality questionnaire, 360 degree assessment exercise, group discussion on business case, role play, presentation, and interview.

By using multiple assessment tools and exercises in the Development Centre, companies could evaluate employees' competencies. The results from the Centre not only allowed companies to make accurate management decisions about development of staff, but also promotion and succession planning.

With this Hong Kong focused competency model, the capability of Hong Kong companies to develop managers from general management roles was improved.

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GRAPH THEORY, JOB-LABOUR SYSTEM AND MANPOWER PLANNING

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Keywords: Community, manpower system, job-labour system, graph, directed graph, electric circuit analogy, flow, storage, flow allocation factor, flow between labour groups, vocational education and training, manpower planning.

Abstract: People working in a community can be grouped into clusters of varying education/training background. Flowing of workers between groups is evident, with movement starting from birth and ending to death. Graph theory is applied to denote the system. Analogy to an electric circuit is referred for quick over-viewing and solution. Figures for manpower planning are predicted.

INTRODUCTION

The administration of a community has the commitment to plan the education and training for providing quality workers to various positions in government and business organisations. The manpower resources of a community can be treated as a system. This system has certain behaviours and can be represented as a "directed graph". With application of graph theory, solution to the flowing between groups of personnels can be found. Based on the solution, manpower planning of a community would be readily handled.

1. Grouping of Manpower

Manpower of a community can be divided into the following groups:

(A) Child (age 14 and below), they are non-workers.
(B) Labour (with threshold of education).
(C) Operator, or Machine Operators (with threshold of education and training)
(D) Craftsman (Operators plus three years of craft training)
(E) Clerk (with threshold of education plus three years of Senior Middle School)
(F) Technician (completed Senior Middle School and four years Tertiary Education), or Associate Professional as it is sometimes called.
(G) Professional (completed Tertiary Education and obtained Professional Qualification)
(H) Manager (with experience of work and ability to manage people for achieving goals)
(I) Retired

2. A Hypothetical Vocational Education System for a Community

It is assumed that a community has a system to teach people to attain the required education and training for the need of the community. We may call it "Education and Training System". This system may include the following:

(a) Everyone in the community is to have a nine-year-long compulsory education. This is called "threshold of education".

(b) People with "threshold of education" are grouped in (b). These people can work as "elementary workers" or "labours".

(c) Those attained "threshold of education" may go through a three-year-long "Senior Middle School Education" to achieve the qualification of a "clerk". A "clerk" is grouped in (c).

(d) Any "clerk" may go through a four year long "Tertiary Education" to achieve the qualification of a "technician". A "technician" is grouped in (d).

(e) Technicians can gain professional experience to become "professionals". A "professional" is grouped in (e).

(f) Any "labour" after a specific training of one tenth of a year can be employed as "operator" ("machine operator"). An "operator" is grouped in (f).

(g) Any "operator", after a craft training of four years, can be employed as "craftsmen". A "craftsman" is grouped in (g).

(h) Everyone, of different VE classes, i.e., (b)…(g), can gain experience and managerial ability. They then become "managers". A "manager" is grouped in (h).

(i) Any "labour", "operator", or "craftsman", after acquiring the level of "Senior Middle School Education" can be employed as a "clerk".

(j) After attaining the age of 65, everyone in the community shall leave his job and retire. These people are grouped as "retired", i.e., group (i).

3. Application of Graph Theory

As suggested in para.2, there are movements of the manpower between groups. With the introduction of a "child" group and the omission of the "retired" group, a graph showing the "simplified manpower system" with flowing of human resources is drawn in Fig.1.

It is noted that the graph has nodes (vortex) representing each manpower resource group, whilst the edges (arcs, or links) are used to represent the flow of manpower from one group to another. The edges are arrows, i.e., "directed edges", and the graph is a "directed graph" or "digraph".

4. Assumptions of the Simplified Manpower System

The system mentioned in para. 3 has the following assumptions:

(1) Annual birth equals to annual death. The population would therefore remain a constant.

(2) The number of both "annual birth" and "annual death" equals to a fraction of the total working population, i.e., no death is assumed for the group of "Child".

(3) No "retired" in the system.

(4) Number of people in each group, i.e., A, B, C, D, E, F, G and H are maintained the same.

(5) Death rate in each of the "working people" groups are the same.

(6) All "child" always attain "threshold of education" at the end of age 14.

(7) It takes a "labour" three years to attain the education level of a "clerk". Same period is required for an "operator" or a "craftsman" to become a "clerk".

(8) It takes a "clerk" 4 years to attain the education level of a "technician".

(9) It takes a "labour" 0.1 year to attain the skill level of an "operator".

(10) It takes an "operator" 4 years to attain the skill level of an "craftsman".

(11) It takes a "technician" 5 years to become a "professional".

(12) For every member of other "worker" groups to become a "manager", two years of job experience is required.

5. Characteristics of the Simplified System

Let A, B, C, D, E, F, G, H be the number of people in each group, and r be the birth rate with the Working Population as the base. Then the following equation are established:

As "child" is for the population of age 14 and below,

$A = 14\, r\,(B + C + D + E + F + G + H)$

Number of births annually = Number of deaths in a year = $r\,(B + C + D + E + F + G + H)$

Deaths in respective Working Groups are then rB, rC, rD, rE, rF, rG, rH respectively.

In order to maintain the population the same in each group, flow from one group to another are thus required.

The following equations show the relationship of IN and OUT at each knot.

$I0a = Iab$

$Iab = Ibc + Ibf + Ibh + Ibx$

$Ibc + Ifc + Igc = Icd + Ich + Icx$

$Icd = Ide + Idh + Idx$

$Ide = Ieh + Iex$

$Ibf = Ifc + Ifg + Ifh + Ifx$

$Ifg = Igc + Igh + Igx$

$Ibh + Ich + Idh + Ieh + Ifh + Igh = Ihx$

Assuming the following

Working Population = 3000000

death rate per "WorkingPopulation" = 0.03

$Ibh : Ich : Idh : Ieh : Ifh : Igh = 4 : 5 : 8 : 10 : 5 : 8$

$Ibc : Ifc : Igc = 8 : 1 : 1$

A solution is obtained with flows: ab=90000, bc=42192, bf = 29088, bh = 720, bx = 18000, fc = 5274, gc = 5274, cd = 24840, ch = 900, cx = 27000, de = 7200, dh = 1440, dx = 16200, eh = 1800, ex = 5400, fg = 15714, fh = 900, fx = 7200, gh = 1440, gx = 9000 and hx = 7200.

6. Directed Graph and Relevant Matrices

The "directed graph" of Fig.1 can be expressed with a number of matrices, i.e., adjacent matrix, weighted adjacent matrix, cut matrix, circuit matrix, etc. Algorithms derived from graph theory can be used to compute the solution using computer softwares.

7. Adjacence Matrix

The "adjacence matrix" is a matrix, with a digit "1" to show the movement from one vertex (on the left column) to another (on the top row), and "0" for none. Fig.2 shows the Adjacence Matrix for the simplified system.

8. Weighted Adjacence Matrix

The "flow rate" value from one group to another is "marked" on the edge. This figure is to replace "1" in the "adjacence matrix". This new matrix is the Weighted Adjacence Matrix of the "directed graph". Fig.3 is the "weighted adjacence matrix" of the simplified system.

9. Planning of Education/Training for Flowing Manpower

As indicated in para.2, 4 and 5, education/training should be needed for the following groups of "Working People" before they are appointed to work on the specific jobs:

(a) Senior Secondary Education, expecting 52740 qualified people to fill the jobs.

(b) Tertiary Education, expecting 24840 qualified people to fill the jobs.

(c) Training for Professionals, expecting 7200 qualified people to fill the jobs.

(d) Training for Managers, expecting 7200 qualified people to fill the jobs.

(e) Training for Operators, expecting 29088 qualified people to fill the jobs.

(f) Training for Craftsmen, expecting 15714 qualified people to fill the jobs.

(g) Lifelong education program for Operators and Craftsman, totaling 10548, to attain the standard of Senior Secondary Education.

(h) Lifelong education program for Operators and Craftsman, totaling 2109 (assuming 20% would require), to attain the standard of Tertiary Education.

10. Analogy to an Electric Circuit

The graph of Fig.1 can also be treated as a circuit diagram with the total current equivalent to the number of births per year. The flows in number per year from and to various groups can be regarded as currents. Arrows between "nodes" can be assigned resistance corresponding to the flow rates. The "birth node" is regarded as the electric source, whilst "death" (died) is earthed to complete the circuit. A circuit diagram shown in Fig.4 is a typical representation of the "Simplified System". With the parameters assigned, Kirchhoff's Current Law and Voltage Law can be applied to determine the flow between groups.

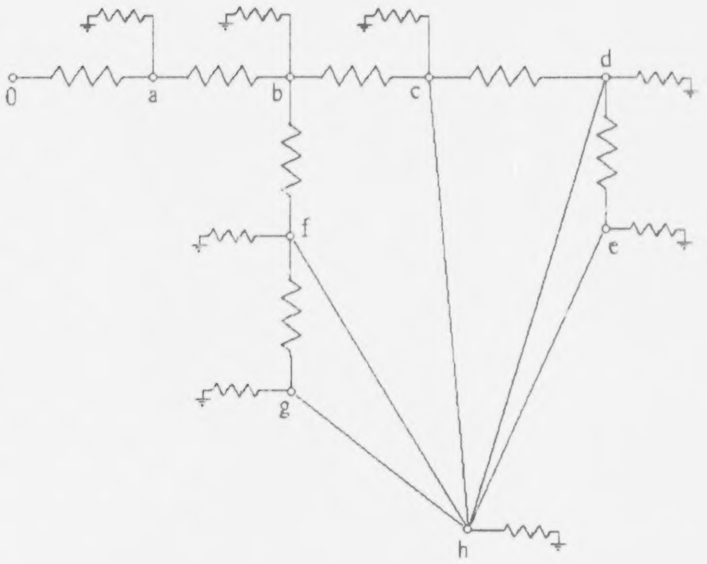

Fig.4 Electric Circuit Representation of the Simplified System

11. Application of Directed Graph Concept to Community Manpower Planning

Manpower planning of a Community requires the anticipation of demand in various group of employees. Use of Directed Graph approach can give an overview of the manpower requirement when statistics of the seven groups are available. Subsystem within a group, e.g., labour for construction industry or for other industries, can be established when needed. Such system approach would give more realistic figures than those derived from Manpower Projection Method which projects figures from historical data of particular group of personnels.

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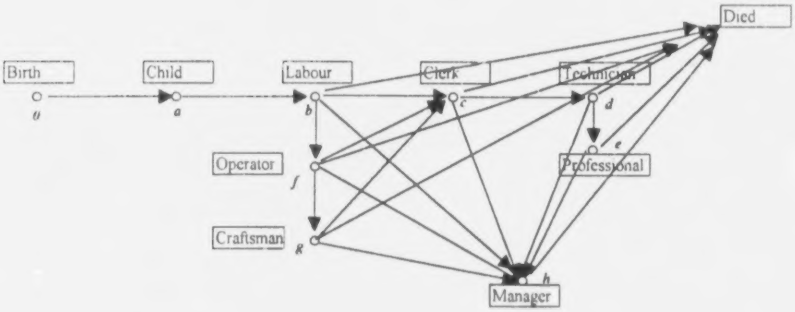
Died
Birth
Child
Labour
Clerk
Technician
o
a
b
c
d
e
Operator
Professional
f
Craftsman
g
h
Manager

Fig1 Movement of Human Resources in a Community

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		0	a	b	c	d	e	f	g	h	x
Birth	0		1								
Child	a			1							
Labour	b				1			1		1	1
Clerk	c					1				1	1
Technician	d						1			1	1
Professional	e									1	1
Operator	f				1				1	1	1
Craftsman	g				1			1		1	1
Manager	h										1
Died	x										

Fig.2 Adjacence Matrix of the Directed Gragh representing the Simplified Manpower System

		a	b	c	d	e	f	g	h	x
Birth	0	90000								
Child	a									
Labour	b			42192			29088		720	18000
Clerk	c				24840				900	27000
Technician	d					7200			1440	16200
Professional	e								1800	5400
Operator	f			5274				15714	900	7200
Craftsman	g			5274					1440	9000
Manager	h									7200
Died	x									

Fig.3 Weighted Adjacence Matrix with "flow" figures as the Weights

OVERVIEW OF ASSESSMENT AND QUALITY ASSURANCE ON TVET AND A PROPOSAL FOR TURKEY

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Index: Assesment, Quality Assurance, Accreditation, Vocational Education.

Abstract: The purpose of this study is to search assessment and quality assurance principles, elements and criteria for the 21st century in terms of national and international competitiveness. Also this study makes suggestions to develop Turkish Vocational Education System in the new century.

The quality assurance system and accreditation of vocational education programmes is concerned with their characteristics, assessment, standards of excellence, and fitness for purpose.

2. INTRODUCTION

Quality Assurance System requires the range of quality issues within curriculum, institutional and staff development, linkage industry, commerce government, the unions, non governmental organisations and setting up the Quality Assurance and Assessment Centre[1].

Assessment is perhaps the most vital of all the processes in vocational education. A high quality assessment system provides the right emphasis on the different aspects of a course, gives students appropriate feedback, ensures that the right students are deemed to have learnt sufficient, and results in a qualification that is well understood. With the right procedures in place, students can be confident in the quality of their training, and employers can have confidence in qualified students.

Quality assurance systems monitors the way a centre carries out its responsibilities depends on the type of centre and the type of qualification being offered. Qualifications is assessed by different types internal and external assessment methods.

3. SOME QUALITY ASSURANCE AND ASSESSMENT SYSTEMS IN THE WORLD

3.1. Quality Assurance Systems in European Countries

There is not one body responsible for the recognition of vocational and Technical Education in Europe.

Each of the member states has it is own national coordinator responsible for the implementation of directives.

There is study to have common quality assurance system in European Union[2].

3.1.2. Quality Assurance and Assessment System in UK.

The UK Qualifications and Curriculum Authority (QCA) came into being on 1997. The new organization brings together the work of National Council for Vocational Qualifications (NCVQ)

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and the School Curriculum and Assessment Authority (SCAA) with additional powers and duties, which gives it an overview of curriculum, assessment and qualifications across the whole of education and training from pre-school to higher vocational education levels[3].

QCA is a non-departmental government body under Department for Education and Employment. In addition to government, QCA represents schools, colleges and training providers; regional bodies and professional associations; parents and school governors; other national bodies and awarding bodies, which offer a wide range of qualifications.

The Scottish Qualifications Authority (SQA) was formed the merger of The Scottish Vocational Education Council (SCOTVEC) and the Scottish Examination Board (SEB). It has taken over all the functions of both it is predecessors and is the national body responsible for most types of qualification in Scotland[3].

SQA's awards can be taken at five different levels, reflecting the increasing levels of difficulty, complexity, or specialization, in a profession or occupation in England, Wales and Northern Ireland, the corresponding qualifications are known as National Vocational Qualifications and Curriculum Authority (QCA) and there should be mutual recognition of SQA and QCA throughout the UK.

3.1.3. Quality Assurance and Assessment in the Germany.

Quality Assurance and Quality Improvement of Persons, Products and Processes is implemented and monitored by private and public organizations in Germany[4].

The basic process of quality assurance consists of four steps in German Quality System:

1. Standards committees develop and adapt standards,
2. Accrediting institutions approve standards,
3. Competent institutions assess quality,
4. Awarding bodies award accreditation or certification.

3.1.4. Quality Assurance System on Some European Countries

- The programmed of the French Baccalaureate professional, created in 1985, is not equivalent to the traditional academic programmers but is designed to be more attractive to students than the other vocational programmers.
- The Norwegian and Swedish reforms that established comprehensive upper secondary schools were introduced in 1994. Academic competencies were extended to vocational students by incorporating more general subjects into vocational programmers. Norwegian reforms affect both educational structures and curricula, While the Swedish reform is mainly structural in emphasizing unification.
- The Finnish " Youth education reforms" begun as an experiment in 1992, has broadened the range of qualifications available especially to vocational students[6].

There is no quality assurance system in European countries like UK. But European Union countries could like have system for international recognition of vocational qualifications[2].

3.2. Quality Assurance and Assessment System in USA

- In the United States, accreditation is voluntarily sought by institutions and is conferred by non-governmental bodies. There are two types of educational accreditation: institutional and specialized[7].

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- An institutional accrediting body evaluates an entire institution in terms of its mission and accredits the institution as a whole. It reviews more than the educational offerings of the institution; it also assesses such characteristics as governance and administration, financial condition, admissions and student personnel processes, institutional resources, and relationships with outside communities. Institutional accreditation is provided by regional associations of schools and colleges (each named after the region in which it operates-Middle States, New England, North Central, Northwest, Southern, Western) and by several national associations (CHEA, AAHE, ACEnet, MHEC, AACC etc) that limit their scope to particular kinds of institutions. While independent of one another, the regional associations cooperate extensively and organize one another's accreditation.

3.3. Quality Assurance System in Australia and in New Zealand

In January 1995, Australia introduced a unified qualifications system for three education sectors; higher education, secondary education, technical and further education; and the previously varied "system" of qualifications has been replaced by one certificate, awarded at four levels, a diploma and an advanced diploma universities continue to issue diplomas and advanced diplomas along with degrees.

3.4. Quality Assurance System in Hong Kong

There are three bodies which offer the Higher Diploma (HD) which is the highest vocational qualification and is at the sub-degree level. The University Grant Committee (UGC) is responsible for seven university institutions –two of which (City University of Hong-Kong-City U and Hong Kong Polytechnic University –Poly U) offer H.D. The Vocational Training Council (VTC) has two Hong Kong Technical Colleges (TCs) which offer the H.D. and the Open Learning Institute of Hong Kong (OLI) is the third body. City U HD graduates are widely accepted in English Universities[8].

3.5. National Technical Qualification System in Korea

Korea introduced the National Qualification Testing (NTQT) system and scheme in 1967. The aim of the NTQT scheme is to officially test and recognize the occupational technical knowledge and skill standarts of individuals and thereby properly guide and direct the training and development of skilled technical manpower required by the business, industries and governmental organizations and at the same time to improve and chance to socia-economic status of skilled technical people:

There are three major qualification categories or divisions in the NTQT system. Engineer Group, Craftsman Group and Service or Business Group[9].

4. A PROPOSAL FOR QUALIFICATION SYSTEM IN TURKEY

In this section it will be given general information about Turkey, Turkish education system and proposed qualification system for Turkey.

4.1. Background Information about Turkish Education System

Turkish governments spend a lot of efforts to develop the Vocational Turkish education system since 1984.

General aspects of Turkish Education System is divided into two main sections as formal and non formal education. Formal education system is also divided in to two sections as a basic education (8

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years), high school and higher education. Ministry of National Education is directly responsible basic education, high school and indirectly higher education. The Council of Higher Education is responsible for planning, coordination and supervision of higher education within the provision of higher education within the provisions set forth in Higher Education law[10].

Turkish governments got loan from World Bank and other loan institutions approximately 500 million USD between 1984-1997 years to develop vocational-technical teacher education at vocational-technical high schools and two years college levels. It could not be established quality assurance system and vocational technical teacher education center especially for two years college so far.

Higher Education in Turkey is at least two years education. Faculty and 4 years colleges education included higher education.

All Universities and Higher education institutions are affiliated with the Higher Education Council (YÖK).

The Council is an autonomous body with the authority and responsibility to administer the activities of all higher education institutions, including universities (faculties, institutes, and two years college.).

There are 75 Universities (53 state + 22 foundation universities), 457 faculties, 221 Institutes, 154 four year colleges, 422 two years colleges.

The number of students attending Universities and other higher education institution in 1999-2000 academic year is about 1 477 000 (43 % female).

The number of teaching staff in higher education is 62 223, comprising 7 980 full professors, 4 948 associate professors, 9 489 assistant professors, 7 482 lecturers, 5 427 language instructor, 25 174 research assistants, and 43 529 others[11].

4.2. Improving Quality of Vocational and Technical Education in Turkey

The rapid development in technology, the globalizations of markets and improvement in communication have affected the national economics of countries. New challenges and new demands are making necessary to reevaluate the educational system in Turkey. In order to meet new standards and set up the qualification system of national and international system in Turkey is being restricted[12].

There is not one body responsible for recognition of vocational qualifications at diploma and certificate education training in Turkey.

Higher Education Council is responsible of higher education (faculties, four-two year colleges etc.)

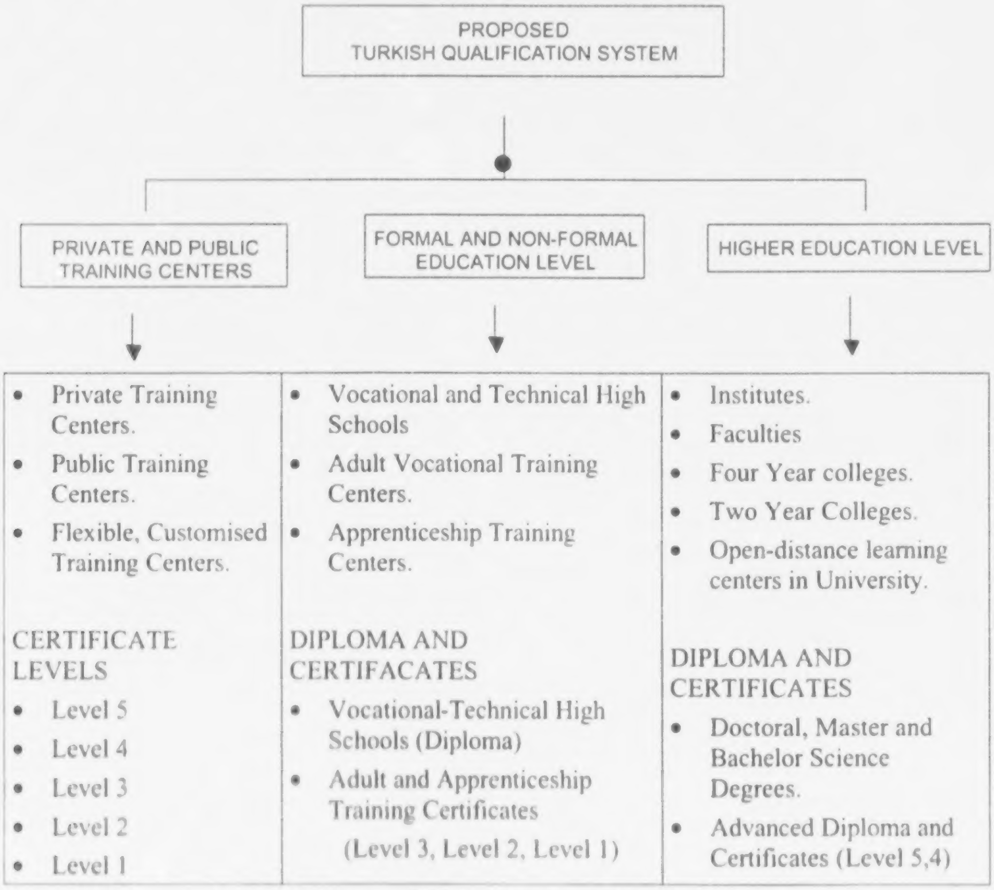
And Undersecretary of Education and five Deputy Undersecretaries coordinate and monitor the education programmes within the Ministry of National education (MONE). Several types of formal and informal industrial technical schools operate through the General Directorate of Technical and Vocational Education.

4.2.1. Level of Certificates in Proposed Turkish Qualification System (TQS)

Level one - Entry level,
Level two - Operative level,
Level three - Craft, technician or supervisory level,
Level four - Higher Technician Level,
Level five - Management or professional level [1]

4.2.2. Schematic Diagram of Proposed Turkish Qualification System

Proposed Turkish Qualification System can be seen in figure 2. Details (operation, procudures, stakeholders of system, assessment, awarding bodies etc.) of proposed system can be discussed later.



PROPOSED TURKISH QUALIFICATION SYSTEM

PRIVATE AND PUBLIC TRAINING CENTERS	FORMAL AND NON-FORMAL EDUCATION LEVEL	HIGHER EDUCATION LEVEL
• Private Training Centers. • Public Training Centers. • Flexible, Customised Training Centers.	• Vocational and Technical High Schools • Adult Vocational Training Centers. • Apprenticeship Training Centers.	• Institutes. • Faculties • Four Year colleges. • Two Year Colleges. • Open-distance learning centers in University.
CERTIFICATE LEVELS • Level 5 • Level 4 • Level 3 • Level 2 • Level 1	DIPLOMA AND CERTIFACATES • Vocational-Technical High Schools (Diploma) • Adult and Apprenticeship Training Certificates (Level 3, Level 2, Level 1)	DIPLOMA AND CERTIFICATES • Doctoral, Master and Bachelor Science Degrees. • Advanced Diploma and Certificates (Level 5,4)

Figure 1. Proposed Turkish Vocational Qualification System

5. CONCLUSION AND RECOMMENDATION

- Turkey, like the rest of the world, is in transition to on information society through fundamental changes in its production systems and the related technology base.
- Essential principles of restructuring vocational and technical education are: formation of new system based on the business/industry-school/college cooperation, leading to a certificate and/or diploma education, Turkey needs very urgent to establish quality assurance system like UK, Taiwan, Hong-Kong, Australia, Korea, USA, Germany etc.
- It should be developed open and distance learning centers to educate the rest of the young people whom have not chance to enroll the universities and not to get high school education.

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- It should be opened vocational technical education centers to be trained the instructor, and teacher to teach them new technology, knowledge in their occupational areas and a foreign language and basic level computer education with period of the 5 years.
- Programs should be designed on a modular basis (like UK), leading to diploma and certificates which will provide for horizontal and vertical transitions between T.Y. colleges and T.Y. colleges and from two years colleges to faculties.
- Vocational and technical training programmes should be designed to prepare students for employment in conformity with international standarts, to facilitate the integration process with Europe and developed countries.
- Graduates from vocational and technical training programmes should be able to enter two years college and curriculum of programmes should be so designed to integrate between vocational high school and two years colleges and from two years college to faculties.

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THE IMPACT OF GLOBALISATION AND THE CHANGING NATURE OF WORK ON VOCATIONAL EDUCATION AND TRAINING

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Index: Globalisation, changing nature of work, vocational education and training, lifelong learning.

Abstract: The world is changing fast these days. Globalisation of economies and rapid technological change critically affects all countries. The education and training systems in all countries have had difficulties in keeping up with the pace of change, yet it is vital that they do so. Some of the key technical skills we will need in 20 years time do not yet exist. This poses tremendous problems and challenges for the provision of education and training (VET).

Several new research studies released by the Australian National Centre for Vocational Education Research have examined the implications of the globalisation and the changing nature of work on vocational education and training. A key finding is that policies to further promote lifelong learning will be fundamental if nation's are to respond to the challenges from globalisation to develop the new skills needed to maximise economic potential.

INTRODUCTION

More has been written about globalisation in the past decade than most other topics in international literature of the subject of the development of nations. Hobart (1999) provides an extensive review of that literature with respect to the impact of globalisation on vocational education and training (VET). In doing so Hobart (1999, p 12) draws up a broader concept of globalisation from Laxar (1995) that encompasses global economic changes including a global shift from goods to services; global ideological changes that emphasises investment liberalisation, deregulation, trade liberalisation and increased private enterprise; new information and communication technologies that "shrink" the globe and global cultural changes involving a shift towards a universal world culture and the erosion of the nation state.

Some commentators such as Hall et al (2000) and Bryan and Rafferty (1999) have emphasised the importance of understanding the impact of global economy and other aspects of globalisation within a nation's borders, rather than thinking of globalisation as a demise of the nation state or as something that happens beyond a country's borders.

This paper examines these issues in terms of the impact on these changes of vocational education and training.

THE CHANGING NATURE OF WORK AND THE EMERGENCE OF NEW SKILLS SETS

Most attention in the research literature on the impact of globalisation on vocational education and training has been given to the impact of globalisation on changing the nature of work itself.

Two key themes in international research literature emerge to set the context for how the nature of work itself is now changing so rapidly. These are—

- the transformation of multinational organisations into *global economic corporate structures* with a consequential reduction in the importance of nation states and their domestic economies (e.g. OECD 1992, Ohmae 1995)
- the rise of the *information* or *knowledge-based economy*. There has been a significant amount of international literature on the subject of globalisation, structured and technological change and the emergence of the information or knowledge-based economy (e.g. Ahier & Esland 1999, Aronowitz & DiFazio 1999, Brown & Lauder 1999 Boisot 1998, OECD 1996, and Carnoy et al 1993).

In particular the impact of the emergence of the knowledge based economy and its impact on changing the nature of work is a recurring theme in the literature.

Drucker (1993, p 38) argued that

> *Knowledge is the only meaningful resource today. The traditional factors of production — land, labour and capital — have not disappeared, but they have become secondary. They can be obtained and obtained easily, providing there is knowledge.*

The impact of these developments is perhaps best described by Reich (1989) who examined the transformation of economies that is taking place from the *old economy* to the *new economy*. He argued that the 'old economy' was characterised by high-volume, standardised production with large numbers of identical items being produced over long production runs. In this 'old economy' most education and training is geared to implementation of instructions and specialised training in job tasks. Reich (1989) argued that in the 'new economy', a workforce capable of rapid learning and innovation is critical. Continuous retraining for more complex work and the transfer of high level skills gained in the workplace context needs to be underpinned by attitudes and learning skills gained long before in the education system prior to entry to the workforce. Reich argued that skills such as working effectively in groups, being able to analyse problems and develop solutions are paramount in the 'new economy'.

Investigation of these issues has also been the subject of increasing interest in Australia in recent years (e.g. Bryan and Rafferty 1999, Martin and Schumann 1997). In particular, Maglen (1994) and Maglen and Shah (1999) have examined changes in the nature of work in Australia arising from globalisation and rapid technological change. They argued that these changes are so profound that a restructuring of how jobs are classified is now required to better reflect the new nature of work. The three broad categories they proposed based on those put forward by Reich (1991), were—

- *symbolic analytical services* which are focussed on problem solving and strategic forms of work. This is a growing and most highly skilled area of work. Moreover these services are the most globally traded
- *in-person services* which include all those occupations which are in direct contact with the ultimate beneficiaries of their work. These services are also growing strongly but are rarely traded globally
- *routine production services* which entail work that is repetitive this being the type of work that is in decline in the economy. These are the services which are transferred from high labour cost to lower labour cost economies, and are then the most precarious of the three groups.

Maglen and Shah (1999) concluded that these developments have profound implications for the university and vocational education and training sectors if the acquisition of the new skills required in Australia are to be world's best practice.

Similarly Hobart (1999), in reviewing the impact of globalisation of vocational education and training in Australia, concluded that

> *The new competitive framework requires a broader set of skills; 'hard' (technical) and 'soft' (interpersonal and communication).* (Hobart 1999, p 42)

Sheldrake (1997) recently made some similar observations. He argued we are facing two massive changes in the global economic system – these being the increasing dominance of the free market capitalist system around the world and an extraordinary increase in the rate at which new products and services are coming onto the market. He likens the current 'knowledge revolution' arising from rapid technological change in the late 20th century to being as profound for the way economies and work are organised as was the industrial revolution in its day. Sheldrake (1997, p 6) suggested the skills need to meet our future skill requirements might include—

- considerably enhanced *people skills*, especially in team leadership, communication, enabling, consulting with others and coaching
- *strategic skills* in developing businesses that take account of the increasing importance of knowledge as a factor (the factor) in competitive success
- *conceptual skills*, particularly those that enhance the ability to see issues from a variety of viewpoints, manage ambiguity and understand the complexities of other culture's values and priorities
- the ability to *empower others*, to be able to manage through dialogue and inter-personal negotiation rather than through power and control
- the capacity to recognise that *learning is an on-going process*, and to continuously re-think and re-examine approaches to work and other fundamental issues.

Research literature on the topic of the changing nature and patterns of work and its implications for vocational education and training was recently undertaken by Waterhouse et al (1999). The study is detailed and covers a lot of material. In summary they concluded that there have been fundamental changes to patterns of working that critically affect learning, yet education and training systems have not managed to keep pace with them. They stress the need for diversity, flexible and greater customisation of education and training as the key responses. Waterhouse et al (1999) identified the three key areas which will require much more emphasis in the future as being—

- the need to develop *learning communities*, rather than just focussing on the education and training of individuals
- the need to develop *collective learning* stressing group competencies, skills and knowledge, rather than persisting solely with the conventional focus of education and training systems on the individual
- the need to develop more *strategic and effective approaches to workplace learning*.

A study by Marginson (2000) also examined the changing nature of and organisation of work and the possible implications for the education and training systems in Australia. He identified six key elements that are driving the changing work environment as—

- *globalisation* which is creating a more international economy and culture
- *increased international competition* is driving an accelerated rate of technological change, particularly in information and communications technology, which are now the key sources of productivity increases

- *rapid technological change* which is leading to declines in 'blue collar work' and increases in skilled 'white collar work', with little or no increases in jobs overall
- *immense but uneven organisation change* in workplaces, where workplaces based on higher worker participation in teams and integrated multi-skilled jobs are tending to make the greatest gains in productivity
- *sharp increases in non-standard forms of work* such as in part-time, casual, outsourced or home-based work
- a *growing polarisation in incomes and in access to work, job security and technology* leading to more two income families on the one hand, and more 'no income families' (i.e. apart from welfare and the most marginal employment income) on the other.

Marginson (2000) argued that these developments have some fundamental implications for the way we need to think about education and training policies. This includes the need—

- to become *totally engaged with the global environment* or face obsolescence
- for workers to develop *higher levels of cognitive and interactive skills*
- for skills formation aimed at the closer integration of work practices into 'the innovation cycle', with much more emphasis on the *skills needed for continuous innovation*
- for education and training practitioners to become *more global, better networked and closer to the technological edge* in every industry
- for education and training policy and interventions by governments, to reflect *the emerging polarisation of access to employment* and the skills formation that goes with it.

This discussion serves to emphasise that the nature of work is changing so rapidly that the education and training approaches needed to prepare people for work of previous generations – that served us well for most of the 20th century – will not continue to meet our needs in the 21st century without further reform. Globalisation has clearly had a major influence on shaping new work forms and on new skill sets that are needed for that work.

Robinson (2000, p 6) concluded that

> *The world is changing fast these days. Globalisation of economies and rapid technological change critically affect all countries. The education and training systems in all countries have had difficulties in keeping up with the pace of change, yet it is vital that they do so. Some of the key technical skills we will need in 20 years time do not yet exist. This poses tremendous problems and challenges for the provision of education and training.*

Robinson (2000, pp 6-7) argued that it is becoming apparent that many more workers in the new millennium will increasingly need—

- excellent *interpersonal* and *human relations* skills to get the best out of people and work well in team-working situations
- critical *analytical* and *interpretive* skills in order to handle and make sense of the enormous amount of information now available
- to be *entrepreneurial* and *enterprising*, irrespective of whether they run a business or work for others as an employee, so that new business opportunities are always being sought.

These skills will be just as important as any technical, para-professional or professional skills people hold. Developing this more diverse range of skills will require new responses form our education and training systems.

THE INFLUENCE OF AN EMERGING GLOBAL CULTURE

Research looking at the impact of globalisation of work and vocational education and training has rarely examined the impact of cultural shifts towards a globalised culture.

A wide variety of issues such as changing cultural and social values, new attitudes to the environment, reactions against global structural change are all important and can be expected to have an impact on the content and provision of vocational education. The information revolution is having a significant impact on globalising a nation's society and culture, as it is on a nation's economic and political sovereignty.

The key issue that is emerging is the global trend towards lower birth rates and smaller families. Changes in the demographic structure of populations towards rapidly aging populations across the world will have just a profound effect on nation's skill development needs and the economic and work factors that are usually associated with globalisation .

Robinson (2000) observed that in Australia, for instance, like most OECD countries, there has been a rapid aging of the population. The proportion of young people in the Australian population has been falling over a long period of time, with reductions in birth rates, increases in longevity and reductions in net immigration.

Robinson (2000) went on to report demographic projections that the number of 15-24 year olds in Australia is likely to remain at around 2.7 million people over the next two decades, even though the total population is likely to grow by nearly 20% overall over the same period. On the other hand, the number of people in Australia aged 45-64 years is forecast to grow over 40% over the next two decades from just over 4 million today to some 5.8 million by the year 2020.

The rapid aging of the population has been given recognition in developed economies in recent years (e.g. European Commission 1997). However, it has rarely received much attention in the world's developing nations. Yet even in large developing countries like Indonesia which currently has well over half the population aged 25 years or less and one third aged less than 15 years, projections are that by the year 2020 two thirds of the population will be over 25 years of age and only 20% will be under 15 years of age (Robinson 1999, p 8).

This dramatic shift in the structure of the populations of most nations means that education and training systems in the future will need to put as much focus on the learning needs of adults as they now do on young people. Post compulsory education and training policy around the world will need to expand the policy focus well beyond entry level education and training towards the learning/ re-skilling needs of adults. Of course entry level education and training will remain just as important in the future as it is today. The point is that skill formation policies of the future will need to properly focuses on learning and skill needs of people of all ages.

THE KEY IMPLICATIONS FOR VET

While not every change and development that effects each nation can or should be attributed to globalisation, it is clear that globalisation is having a profound impact on economic, social and cultural change in all nations. Recent research in Australia by Bryan and Rafferty (1999) and Hall et al (2000) cautions us against attributing everything to the global economy or of conceptualising as something beyond a nation's borders.

Nevertheless, the analysis in this paper leads to two key conclusions concerning the future direction of education and training provision as a result of global trends.

First, we need to ensure that all post-compulsory education and training becomes highly developed in imparting the generic skills that are becoming so essential across the whole labour force. This is particularly important in the new jobs emerging as a result of the increasing globalisation and the onset of the information age. Proficiency and competency only in the technical, para-professional or profession skills of a job alone will not be sufficient in most jobs.

The second key conclusion is that we need to overhaul the provision of post-compulsory education and training to cater better for the vastly increased amount of adult learning that will need to take place. Strategies to further the development of lifelong learning will be of prime importance. Just as we have developed pathways designed to improve the transition from school to work or from school to further and higher education and training for young people, we now need to turn our attention to the further development of "adult pathways".

The logistics of reinventing VET programs that are more capable of facilitating continuous and rapid learning in the new skills will require a very different and more diverse approach with new learning options and pathways. This will require—

- education and training programs that change continuously as the new skills required in the workforce change
- the development of new education and training programs and learning styles that are geared to meeting the particular needs of older learners, many of whom will already be employed and/or who already have qualifications.

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IN SEARCH OF A GOVERNANCE FRAMEWORK OF VOCATIONAL EDUCATION AND TRAINING FOR THE 21ST CENTURY: AN INTERNATIONAL COMPARATIVE STUDY

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Abstract : This paper focuses on the governance framework in relation to the decision-making process which designs, moulds and formulates the policy on vocational education and training (VET) to meet the needs of various industrial and commercial sectors in Hong Kong.

There has been a long history of an apparently close relationship among government, businessmen and academics who form a tripartite alliance in making decisions on VET within the framework of the government's co-optation strategies. Such a triple alliance may be regarded as a necessary and desirable outcome of the political system and environment in Hong Kong. It may also be a trend towards which many countries, whether developed or developing, have steered their system of policy-making in relation to VET.

This paper will attempt to analyze the concept of a co-optative decision-making system in relation to VET by comparing it to the traditional mode of decentralized decision-making process, which had been put into place since the 1960s. An overview of the decision-making systems of 10 selected countries will be made in order to understand why and how the policies on VET may be formulated in the context of the diversity of social and political systems in these countries and yet still follow a general pattern of cooperation and rationalization among various stakeholders. These 10 representative countries are Australia, Brazil, Canada, Finland, India, Italy, Philippines, Singapore, South Africa, and Switzerland. The decision-making systems of these 10 countries will be highlighted and compared with respect to the delivery of quality VET. Tables for comparison will be used as far as possible

To conclude the paper, a more refined decision-making system, which extends the ideas of the triple alliance but also incorporates the involvement of various stakeholders, is recommended to foster further development in quality VET.

Practitioners often are confused by theories that offer ambiguous prescriptions for designing the institutional forms or governance structures in which organizational activities are conducted (Bello, Shirish, & Lohtia, 1997). This paper attempts to show that the governance framework in determining vocational training policy in Hong Kong relies on a triple alliance of government, businessmen and academics. A brief study of the corresponding decision-making bodies on VET policy of 10 selected countries is made for comparison with the case in Hong Kong. Conclusions and recommendations are made based on the observations.

VET in Hong Kong

In Hong Kong, the Vocational Training Council is the principal institutional agency set up by the government responsible for planning and implementing policy on vocational training. In 1982 when the Council was established, its total expenditure was only HK$118 million (Hong Kong dollars). In 1998, the corresponding figure has increased by over 14 times to HK$2,237 million after 16 years of operations. The Hong Kong case of the implementation of training policy generates valuable lessons on the need of an appropriate VET system. Hong Kong has dramatically reformed its vocational training system several times in the span of only two decades. Each reform has been introduced in concert with the transformation of the Hong Kong economy. Initially the change was from entrepot trading to industrialization. This was followed by a transition to a high technology, export-oriented economy. More recently, the move has been towards the development of an international investment and business centre, capturing high technology, high-valued-added manufacturing at the China mainland.

The history of the development of the Vocational Training Council illustrates the Hong Kong government's changing perception of the purpose of VET and the government's role in its provision of VET. In the 1960s, the government did not take any active part in making VET available and there were only a few government-run training schemes. The formation of the Industrial Training Advisory Committee in 1965 however showed that the government planned to do something about the provision of VET. Through the establishment of the Hong Kong Training Council in 1973, the government managed to put in place a list of training schemes supported by findings of economy-wide biennial manpower surveys conducted by the Council. The most significant scheme, the apprenticeship scheme, was implemented through the enactment of the Apprenticeship Ordinance in 1976. The Ordinance required an employer to enter into a contract of apprenticeship when engaging a youngster under 14 in one of 26 designated trades. According to the contract, employers were required to provide a comprehensive on-the-job training for their apprentices who would attend a 2 to 3 years part-time-day-release programme at technical institutes. The training however would be monitored by the government through the enforcement of the contract. By promoting and enforcing such a scheme, the government had become a "facilitator" and "provider' of VET.

1982 was a milestone for vocational training in Hong Kong. Since the establishment of the Vocational Training Council in that year, the government has built 2 technical colleges, 7 technical institutes, and 24 training centres providing VET for over 30,000 trainees annually. Considering a population of only six million, the trainee output is indeed an outstanding achievement. The vast number of trainees produced each year suggests that the government has become a major "provider" of VET in Hong Kong through these training centres.

Decision-making bodies

There are different views, valid or invalid, regarding the roles of the decision-making bodies of the Vocational Training Council in Hong Kong. They can be seen as being responsible for strategic formulation of long-term policies on VET, or primarily as organs that are created to legitimize the Hong Kong government's central policy, or as bodies overseeing the day-to-day functioning of the vocational training operations, or as protectors or defenders of the executive management against external political and social pressures and criticisms. In Hong Kong, boards and committees formed by the government may be described as a type of representative policy-making bodies which the government wishes to give voice in the decision-making process so as to represent defined interest groups and provide for a kind of forum for interaction and discussion.

In a study of the decision-making bodies of the Vocational Training Council, Hung (1998b) observed that there was in place a triple alliance among business-based (businessmen), knowledge-based (academics and professionals), and polity-based members (government officials and politicians) in decision-making bodies of the Council responsible for making policies on the provision of VET to the economy. He argues that "the triple alliance is a mechanism through which the government forms a partnership with three major types of interest groups in the community to make operational decisions" (Hung, 1998b: 52). He concludes that although the decision-making system is currently working well, in order to build up a more effective vocational education and training system, more power and authority, especially the economic decisions of resource allocation and administration decisions relating to the running of training centres and technical institutes, should be devolved to these decision-making bodies.

As observed by Hung (1998b), the training boards and general committees are composed of members who are businessmen, industrialists, professionals, academics, and government officials. All major decisions will have to be discussed, argued, and approved by these representatives to ensure that the interests of all major stakeholders are protected. These decisions include not only the courses but also administrative functions relating to these courses. The following international comparative study will serve to illustrate the case that VET decision-making mechanism in Hong Kong is commonly found in many developed countries.

International Comparative Studies

A documentary research of 10 countries has been carried out with regard to the decision-making bodies on VET in these nations. These samples are selected on the basis of data availability rather than a comprehensive representation of the various types of decision-making bodies.

A policy on VET involves the decisions in defining what occupational roles are perceived as economically or politically important and how these roles can, through VET, be efficiently and sufficiently fulfilled. The former decision requires an economy-wide evaluation of the economical, technological, social or political significance of various occupations while the latter involves operational decisions as how appropriate training programmes are to be implemented. Most countries have established some forms of decision-making bodies in formulating and implementing policies on VET.

The purpose of the international comparative study is to ***illustrate***, rather than to ***prove***, the notion that major decisions on VET can be made in three ways: executive-led, expertise-led, and participative type of decision-making. These three types of decision-making processes show that the state of economic development has an observable correlation with the way VET decisions are made. Table 1 shows the economic development, geographic location, and political stability of these 10 countries.

Methodology of Analysis

There is no intention whatsoever in this paper to investigate the detailed political, social, economic or cultural characteristics of any countries. Due to the restraint in resources, there will be no quantitative statistical analysis of the composition of the decision-making bodies on VET in question. A brief analysis of the composition will suffice to identify the general pattern. Table 2 gives a list of the decision-making bodies on VET for Hong Kong and 10 selected countries.

Composition of Decision-making Bodies

All decision-making bodies are made of people and it is actually the people in these bodies that make decisions. The values and orientation of the individual members will become one of the key determinants of the decision-making system. An analysis of the rationale of decisions may be made through an examination of the people inside the decision-making bodies.

Following the methodology adopted by the study of Hung (1998b), members in the VET decision-making bodies are being grouped into four major categories: management-based, business-based, knowledge-based and polity-based. Management-based members are those who work directly for and within the agencies offering VET. They are nominated by the agencies to represent their agencies' interests and explain the agencies' policy and practices to other members. Business-based members are affiliated to and in some cases nominated by associations or groups of businessmen and industrialists. They represent the various interests of the business sector. Knowledge-based members come from or are nominated by professional bodies as well as tertiary education institutions. Polity-based members come from pressure groups, such as labour unions, and political parties.

Table 3 shows the composition of membership of the decision-making bodies on VET in Hong Kong and 10 selected countries.

Types of Decision-making

Based on the analysis of the composition of decision-making bodies on VET as shown in Table 3, three major types of decision-making systems on VET can be identified: executive-led, expertise-led, and participative. Table 4 provides a description of these three types of processes.

VET in all the 10 countries are provided by the respective governments or their agencies. Executive-led way of decision-making on VET focuses on the leadership and centralized planning of the government. This is common for most developing countries where power for decision-making is held firmly by the central government. Expertise-led way of decision-making relies on the support and know-how of academics and professionals in making quality decisions. This is particularly important when the economy is undergoing drastic changes or facing major crises. Expertise-led decision-making can increase the chance of thriving in uncertainties. Participative way of decision-making is commonly found in developed economies. The system allows for thorough interaction and discussion among various stakeholders of VET for making quality decisions. Most decisions will be more likely acceptable by the general public.

Since 1982, by adopting the participative type of decision-making system on VET, Hong Kong has been going along the line taken by most developed countries. The progress of the Vocational Training Council in the past years has proved that the system has been working well.

The Analysis

The focus of this paper is on the decision-making system in relation to the strategic direction of the provision of VET in Hong Kong. It may be a common belief that it is the fiduciary duty of the government to ensure that an adequate supply of trained an skilled workforce is ready and willing to serve the economy. The government fulfils its roles and duties through the services provided by its agencies. As a government agency, the Vocational Training Council has the role and mission to take up the full responsibility of the planning, formulation an implementation of the policy on VET in Hong Kong. In order to fulfil its designated task, the Council must develop or maintain an effective decision-making system that can formulate appropriate VET to meet the changing needs of Hong Kong's economy.

The decision-making body on VET is only part of the government's machinery of decision-making. Boards and committees have a relatively long history in Hong Kong. After the riots in 1966 and 1967, the government has started to reconceptualise its role and plays a more active part in providing more social services to satisfy the needs of the community. The change in the political ideology can be illustrated in the Urban Council White Paper, which was issued in 1976. It states that "public participation in the management of public affairs *should be* achieved, to a very considerable extent, by a highly developed network of *decision-making* bodies which *should be* an important and very characteristic feature of Hong Kong scene" (Urban Council White Paper, 1976:46, italics added).

Since then Hong Kong government has set up quite a number of committees and boards. The Civil and Miscellaneous List 1998 gives details of 264 committees. There are 154 committees or boards that were set up under various ordinances. The reasons why such committees or boards have been set up or subvented may differ in each case. In general it appears that the government has decided that its objectives can be achieved more effectively or cheaply by an organization not under direct day-to-day governmental control and not bound by the strict rules of Civil Service Regulations. Such organizations are as a result better placed to respond promptly and flexibly to changes in demand and are expected to act like commercial firms in delivering their services. The establishment of the Vocational Training Council is a good example of such a movement.

The history of the development of VET in Hong Kong can demonstrate the trend toward decentralization and public participation in decision-making. The decision-making bodies on VET during the era of the Industrial Training Advisory Committee (1965-1973) were mainly to advice and make recommendations on possible VET problems. These "prototypes" of boards and committees had no real power other than advising the government.

The decision-making body on VET under the auspices of the Hong Kong Training Council (1973-1982), the Committee on Technical Institute, was set up to advise the government on the measures necessary to ensure that there was a comprehensive system of VET geared to the developing needs of Hong Kong. The executive function of the Committee on Technical Education was in place after the enactment of the Vocational Training Council Ordinance in 1982.

The decision-making system on VET since 1982 is in part based upon a belief that stronger partnership should be developed among the business, professional and academic sectors. In both the media and government documents, there is a commonly held conviction that the old elite system of higher education has failed the business sector. Whether this is a fair point is a question that exceed the scope of this paper. However, it is important to note that it is this argument that has influenced the current profile given to the Vocational Training Council in providing VET, and it is this assertion that has enabled the businessmen and professionals to play an important role in VET.

It is generally agreed that as a society proceeds with its economic development, the citizenry will tend to demand more participation in the decision-making process. That is why democracy is common in most developed countries. The need for decentralization may be addressed by the need for responsiveness. The Report of the Advisory Committee on Diversification proposes that the system of VET should be capable of producing a workforce which could adapt to changes and new needs. It attributes Hong Kong's economic success to the responsiveness, high mobility and high redeployability of its labour force. Decentralization may be said to enhance the ability of the administration to respond to the changing demands of the economy, decrease the remoteness of government agencies in relation to their clients and increase the accessibility to the citizens.

After nearly two decades of development, the VET system in Hong Kong may now have reached the point where decentralization becomes necessary and irreversible. An ideal governing board of a government agency should be responsible for determining the policies or strategies to be pursued by the agency, and for determining how the board's powers could be best exercised in the public interest within the objectives set out in the enabling legislation or articles of association. The governing board should have a leading and planning role in defining agencies' objective and strategies, choosing the appropriate technology, critically examining management plans, formulating an overall plan, communicating it to the organization, motivating managers or administrators to perform, monitoring performance against the plan and taking action when objectives are not reached. This should give a fairly clear picture of what an ideal governing board should like. In view of the changing economic environment, more power and authority should be given to the decision-making body on VET of the Vocational Training Council.

CONCLUSION AND RECOMMENDATION

In spite of the limitation of a small sample size of merely 10 countries, the international comparative study however can still manage to illustrate that there are three types of decision-making bodies on VET in these economies. Since there is an obvious tre participative type of decision-making on VET policies in developed countries, Hong Kong therefore follows along this line in planning its proposed reform on the decision-making structure on VET. As there is an increased trend of technological development and higher expectation of economic welfare in the Hong Kong society, there is a need to enhance the responsiveness of service-providing agencies through a process of decentralization. It is therefore recommended here that in order to build up a more effective VET system, more power and authority, especially the economic decisions of resource allocation and administrative decisions relating to the running of VET programmes, should be decentralized.

In short, the old decision-making system has been working well and there is little need for reforming the system. Improvement can however be made by decentralizing further the decision-making power to the hands of the decision-making bodies with more participation of the various stakeholders. The recommendations in this paper only provide a starting point for the conception of an appropriate course of action to be undertaken. The key issue is that VET in Hong Kong, or other places in this world, is not simply a matter of improving labour productivity; it has a subtle political role in maintaining the economic prosperity of the entire society.

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Table 1
A List of 10 Selected countries for analysis

COUNTRIES	ECONOMIC DEVELOPMENT	GEOGRAPHIC LOCATION	POLITICAL STABILITY
Hong Kong	Newly developed	Asia-Pacific	stable
Australia	Newly developed	Asia-Pacific	stable
Brazil	Developing	S. America	moderate
Canada	Developed	N. America	stable
Finland	Developed	N. Europe	stable
India	Developing	Asia-Pacific	moderate
Italy	Developed	Europe	stable
Philippines	Developing	Asia-Pacific	moderate
Singapore	Newly developed	Asia-Pacific	stable
South Africa	Developing	Africa	moderate
Switzerland	Developed	Europe	stable

Note:
(1) Hong Kong is added to the list for comparison.
(2) The classification of economic development and political stability is based on World Bank reports in 1993 and 1994.

Table 2
A List of the Decision-making Bodies on Vocational Training Policy of 10 Selected Countries

COUNTRIES	BODIES RESPONSIBLE FOR MAKING DECISIONS ON VET
Hong Kong	Vocational Training Council
Australia	Australian National Training Authority
Brazil	National Industrial Learning Services
Canada	Canadian Training Boards at the local provincial level
Finland	National Board of Education
India	Central Advisory Board of Education (CABE)
Italy	Ministry of Education and Ministry of Labour
Philippines	Technical Education and Skills Development Authority (TESDA)
South Africa	Committee of Technical College Principals
Singapore	Institute for Technical Education
Switzerland	Association for the Promotion of Continuing Vocational Education (VFBW) in cantons.

Table 3
The Composition of the decision-making Bodies on VET in the Selected Countries

COMPOSITION OF MEMBERS				
Countries	Management-based	Business-based	Knowledge-based	Polity-Based
Hong Kong	--	X	X	X
Australia	--	X	--	X
Brazil	--	--	X	--
Canada	--	X	X	X
Finland	--	--	X	--
India	X	--	--	--
Italy	X	--	--	--
Philippines	X	--	--	--
Singapore	--	X	X	--
South Africa	--	--	X	--
Switzerland	--	X	--	X

Table 4:
Three Types of Decision-making Systems on VET

	TYPE I	TYPE II	TYPE III
Types	Executive-led	Expertise-led	Participative
Characteristics	Members of all major decision-making bodies are management-based	Members of all major decision-making bodies are knowledge-based	Members of all major decision-making bodies are a mix of business-based, knowledge-based, and polity-based.
General pattern	Centralized	Think tank	decentralized
Examples (from 10 selected countries)	India Italy Philippines	Brazil Finland South Africa	Hong Kong, Australia Canada Singapore Switzerland
	Mainly developing countries (except Italy)	No distinct pattern but more common in countries where there are major changes in VET systems	Mainly developed countries

CROSS BORDER ACTIVITIES TO STRENGTHEN TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING SYSTEMS IN THE INFORMATION ERA

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Index: TVET; capacity building; cooperative activities; education for the world of work; UNEVOC network; UNESCO

Abstract: This presentation aims to consider issues of cooperation in the international arena which are raised by the premise that technical and vocational education and training (TVET) is a critical and integral component of lifelong learning. The paper outlines the objectives and strategies of UNESCO's UNEVOC Network and challenges the audience to consider what strategies they can encourage in their own countries and regions that will facilitate international cooperation and subsequently strengthen TVET systems. Issues which will be discussed will include maximising national capabilities through training and cooperative activities such as articulation and recognition of courses across national borders, identifying competencies which are common across countries in regions, and identifying possible cooperative training activities etc. Informing the presentation are the outcomes and recommendations of the UNESCO Second International Congress on Technical and Vocational Education (*Lifelong learning and training: a bridge to the future*) held in Seoul, Republic of Korea in April 1999. These recommendations are the basis and the core of the UNESCO International Program on Technical and Vocational Education and Training which the General Conference of UNESCO authorized the Director-General to launch in November 1999 and fall into three key areas: improving Member States' TVET policy-making capacity, assisting Member States' institutional capacity-building and enhancing international co-operation.

TECHNICAL VOCATIONAL EDUCATION AND TRAINING AND LIFELONG LEARNING IN THE INFORMATION AGE

This presentation aims to consider the international issues which are raised by the premise that technical and vocational education and training (TVET) is a critical and integral component of lifelong learning. Also it explains how cross border activities carried out under the auspices of UNESCO/UNEVOC have contributed to strengthening of technical and vocational education systems in the Asia Pacific region. During the late 20th century, all sectors of education have been faced with issues surrounding the concepts of 'lifelong learning' and the complexities surrounding the 'information age'. None more so than the technical vocational education and training sector as the nature of work changes; the education sector which in some countries sits between the compulsory education years (K-12) and higher education, in others, forms part of the upper secondary education years.

The Delors Report (Learning: the Treasure Within1996) emphasised and concluded that education must be supported by four pillars; learning to know, learning to do, learning to live together and learning to be. As Colin Power stressed at the recent UNEVOC Congress in Seoul, 'the information society of the 21st century will put greater value on learning to do, on the skills and competencies needed to put knowledge into action…Today, more than ever before, technical vocational education and training has become a necessity not only for young people who will have to prepare themselves for the challenges of the next century, but also for the entire population of each country so that every individual can play an active role in the world of the 21st century that seeks to narrow economic and gender disparities while preserving the integrity of the environment.' (UNESCO 1999: 88)

Interwoven with these personal imperatives are the demands of enterprises and industries which require workers to have skills which will enable them 'to be smarter, faster, more effective, and more efficient, less environmentally damaging, produce less waste and to waste less time', to make use of new technologies, new ways of doing business and the effects of globalisation. (Bartram 2000: 1)

These demands affect not only young people. In the developing world these additional demands are being placed on those who have not had access to basic education and, for the developed world, on those who may be already in the workforce or those who due to work restructuring are facing career changes. In the words of the previous Director General of UNESCO:

> To keep pace with changes in work organisation and production technology, people need to increasingly renew and upgrade their skills. This calls for the integration of technical and vocational education into lifelong learning systems. Indeed, technical and vocational education must articulate more effectively with secondary, higher and adult education. In the developing world, particularly in rural areas, providing basic skills education is still the challenging task. The promotion of literacy alone, however, is not sufficient. Experience demonstrates that a combination of literacy education and vocational skills learning is an effective method of empowering people to improve their standard of living. The inclusion of vocational subjects in the general education curricula equips students with basic technological and vocational knowledge and awareness. The integration of vocational skills training in general education is also likely to contribute towards gender equity in the technical professions. (UNESCO 1999: 77)

These issues are particularly pertinent in the diverse Asia Pacific region which contains the largest proportion of the world's population which includes the most disadvantaged in the world; an area which is comprised of both the smallest and the largest countries in the world, many of which are struggling to provide basic infrastructures to support their peoples, let alone sophisticated information technology.

UNEVOC

UNESCO's response to these demands has been the establishment of UNEVOC, UNESCO's International Project on Technical and Vocational Education. The project is dedicated to developing and improving technical and vocational education in UNESCO's Member States with a focus on information exchange, networking and international cooperation. The following information about the project is based on the UNEVOC web pages (UNEVOC 2000).

During 1987 UNESCO held its first International Congress for the Development and Improvement of Technical and Vocational Education in Berlin, Germany. Strong support was shown by the member countries present to establish a mechanism for the international exchange of information on technical and vocational education. Subsequently, the General Conference of UNESCO, at its twenty-fifth session in 1989

- 'adopted the Convention on Technical and Vocational Education. This standard-setting instrument provides a coherent set of concepts and guidelines for the development of technical and vocational education in Member States. It pays particular regard to the assuming of public responsibility for framing policies and defining strategies in order to ensure that technical and vocational education is considered to be an integral part of the education system.
- invited the Director-General of UNESCO to carry out a feasibility study on the establishment of an International Centre for Technical and Vocational Education.

This feasibility study recommended that UNESCO's activities in technical and vocational education should concentrate on technical and vocational education as a component of the overall education system. Based on that feasibility study, which was completed early in 1991, the General Conference of UNESCO decided, at its twenty-sixth session in 1991, to launch the International Project on Technical and Vocational Education (UNEVOC). This decision was confirmed by the General Conference of UNESCO at its sessions in 1993, 1995 and 1997.' (UNEVOC 2000).

In accordance with that decision, UNEVOC is designed

- to contribute to the development of systems of technical and vocational education
- to promote infrastructures in research, development and planning
- to facilitate information and communication in these fields.

STRUCTURES AND MECHANISMS

UNEVOC is carried out under the responsibility of the Education Sector of UNESCO supported by an International Advisory Committee which advises the organization on the preparation and implementation of the UNEVOC program. Many activities within UNEVOC are executed on a regional basis and UNESCO's Regional Offices play an important role in the implementation of the project:

- **Africa**: Regional Office for Education in Africa (BREDA)
- **Arab States**: Regional Office for Education in the Arab States (UNEDBAS)
- **Asia and the Pacific**: Principal Regional Office for Asia and the Pacific (PROAP)
- **Latin America and the Caribbean**: Regional Office for Education in Latin America and the Caribbean (OREALC)

Following the decision on UNEVOC taken by the General Conference in 1991, the Government of the Federal Republic of Germany offered to host an Implementation Unit in Berlin. Germany has provided premises and equipment for this Unit (opened in 1993) in addition to dedicated staff under the leadership of Mr Hans Kronner.

An international team evaluated the UNEVOC project in 1996-1997, resulting in a set of recommendations to the Director-General of UNESCO regarding the ongoing development of the project.

THE UNEVOC WORK PLAN FOR 1998-1999

As an indication of the work carried out under UNEVOC, the following activities were carried out during 1998-1999:

- International exchange of ideas, experience and studies on policy issues
- Strengthening of national research and development capabilities
- Facilitating access to databases and documentation; strengthening the UNEVOC Network.

International exchange of ideas, experience and studies on policy issues

This area provides opportunities for the Member States to exchange views on policy issues in technical and vocational education and aims to contribute to reducing the gap between the industrialised and developing countries.

Key areas which formed the focus for this activity included:

- Raising the status of technical and vocational education
- Coordination of policies for education, training, and related activities
- Orientation of education towards the world of work
- Linkage between technical and vocational education institutions and the world of work.

The key actions for this program area were based on the recommendations of the evaluation of the UNEVOC Project in 1996-1997 including

- a draft strategy for UNESCO's future role in the development of technical and vocational education (to become after the 1999 General Conference meeting, the Long Term Program on Technical and Vocational Education).
- the Second International Congress on Technical and Vocational Education (Seoul, 1999) in cooperation with the Government of the Republic of Korea, and with United Nations and other agencies. The Congress was preceded by a series of Regional Symposia in each of the five regions, Asia and the Pacific (Adelaide, South Australia March 1998), Europe (Crete, Greece September 1998), Arab States (Abu Dhabi November 1998), Africa (Nairobi, Kenya November 1998), Latin America and the Caribbean (Quito, Ecuador November 1998), Eastern Europe (Moscow March 1999).

Strengthening of national research and development capabilities

Key areas which formed the focus for this activity included:

- International transfer and adaptation of curricula;
- Promoting innovative concepts in technical and vocational education;
- Providing equal access of girls and women to technical and vocational education;
- Staff development.

The key actions for this program area in the Asia Pacific region included:

- regional curriculum development projects, for example, the design of curricula on entrepreneurial skills for small business through workshops in Australia, India and China. This curriculum has also now been implemented in China. training of and recruitment standards for teachers and trainers in technical and vocational education
- advisory, project formulation and other consultancy services to identify and prepare project proposals for submission to funding agencies.
- development of the capacity of UNEVOC Centres to contribute to planning, development and research in technical and vocational education on the national level, supported through training workshops and small-scale projects.
- the feasibility of developing a training model for the Asia/Pacific region, explored in an expert meeting convened in Pakistan.

Facilitating access to data bases and documentation; strengthening the international networks

The aims of this program area included:

- to enhance UNESCO's clearing house function in technical and vocational education,
- to facilitate access to relevant information,
- to facilitate interaction and to strengthen co-operation in the UNEVOC network.

Workshops to provide training to facilitate the exchange of TVET information and documentation and to identify the infrastructure needed to facilitate communication between existing national and regional institutions in technical and vocational education were held in the Asia Pacific and African regions. The establishment of databases in Australia (the inclusion of UNEVOC and the International Labour Office (ILO) Asia Pacific Skills Development Information Network (APSDIN) data in the VOCED database, hosted by the Australian National Centre for Vocational Education Research) and Canada (Canadian UNEVOC Centre at the University of Manitoba) have been concrete outcomes of the actions taken during this period.

Across the world, the UNEVOC network includes more than 160 institutions from 110 Member States. In the Asia Pacific region the network includes 47 institutions in 30 Member States. Co-operation among these institutions has been encouraged to:

- improve the flow of information
- share experiences, problem solving ideas and research results
- enhance international co-operation.

Strategies to achieve these outcomes have included the publication (in print and electronic forms) and dissemination of

- the quarterly *UNEVOC Info* in both English and French, Arabic and Spanish. This publication supports the Network with relevant information and also serves as a communication instrument among the participating institutions and experts.
- studies and document on technical and vocational education
- the Directory of UNEVOC Centres and UNEVOC Associate Centres

The clearing house function of UNEVOC has been facilitated through the development and management by the Berlin Implementation Office of:

- the UNEVOC Web Site
- an Internet e-mail Document Server which facilitates the retrieval of documents
- an electronic mail server which provide users with an interactive facility for communication and exchange of information with one another and with other interested professionals
- Internet seminars to support UNEVOC Centres in their efforts to utilise modern information and communication technology for international communication and information retrieval, in particular Electronic Mail and the WorldWideWeb.

Co-operation among UNEVOC Centres has been promoted through the following activities:

- assisting UNEVOC Centres in finding appropriate partner institutions and sponsors from the private sector for joint activities
- encouraging bilateral and multilateral research and development projects
- facilitating study visits, fellowships, and internships for experts in the UNEVOC network to gather experience in other environments within that network, including Regional Offices and UNEVOC Berlin
- encouraging continual dialogue and information exchange among UNEVOC Centres.

UNESCO SECOND INTERNATIONAL CONGRESS ON TECHNICAL AND VOCATIONAL EDUCATION

UNESCO's Second International Congress on Technical and Vocational Education (*Lifelong learning and training: a bridge to the future*) was held in Seoul, Republic of Korea in April 1999 and has been described as a landmark event in the development of global technical vocational education and training. The objective of the Congress was 'to give its Member States an opportunity to discuss how the field of Technical and Vocational Education and Training (TVET) should adjust to the needs of a rapidly changing world. Since globalization and dramatic developments in the information and communication technologies are expected to be features of the early years of the twenty-first century, it was felt that TVET must adapt to adequately prepare people for the world of work and responsible citizenship'. (UNEVOC 2000)

The Congress identified the major challenges to education at the beginning of the 21st century and the discussions addressed the following themes:

- Challenges to education and training: the changing demands of the world of work
- Improving systems for education and training throughout life
- Reforming the education and training process
- Promoting access of special groups to technical and vocational education and training
- The changing role of government and social partners in technical and vocational education and training
- Enhancing international cooperation in technical and vocational education and training.

The Seoul Congress formulated a set of recommendations for upgrading TVET that were listed under the caption Technical *and Vocational Education and Training: A Vision for the Twenty-first*

Century. These recommendations are the basis and the core of the UNESCO International Program on Technical and Vocational Education and Training which the General Conference of UNESCO authorized the Director-General to launch in November 1999.

OBJECTIVES FOR THE FUTURE

The International long-term program for the development of TVET includes the following objectives and strategies.

Objective 1: Strengthening TVET as an integral component of lifelong learning

TVET policies need to be redesigned in order to respond to the varied needs of all members of society, and to help them achieve personal and social development. UNESCO's activities in this area aim at:

- Infusing into general education curricula appropriate content for the young to understand the nature and process of the world of work
- Improving the links between TVET and other sectors of education, and developing articulation between education and training systems
- Fostering the role of governments and the involvement of all stakeholders particularly the private sector.

Objective 2: Orienting TVET for sustainable development

TVET should play a pivotal role in developing a new generation of individuals who must face the challenge ,of contributing to sustainable socio-economic development. The Program will be implemented with the aims of:

- Ensuring that TVET is an integral part of each nation's sustainable development agenda, and its education and human resource development strategy
- Incorporating environmental issues into all TVET teaching and learning situations
- Providing TVET in the service sector to ensure environmentally sound economic growth and employment creation.

Objective 3: Providing TVET for all

Besides preparing people for the world of work, TVET is expected to be an instrument for social cohesion and integration. UNESCO supports its Member States' efforts to make TVET programs comprehensive and adequately inclusive. UNESCO will aim to achieve the following:

- Promoting special initiatives and efforts to ensure equal access to TVET for girls and women
- Making TVET programs available to the unemployed and various marginalized groups
- Reorienting vocational guidance and counselling to reach out to all members of society, and promoting flexible access to learning and training throughout life.

These objectives will be implemented towards the achievement of these objectives by adopting three key strategies:

Improving Member States' TVET policy-making capacity

The following activities will be undertaken to assist Member States' efforts in formulating policies for the renovation and integration of TVET as a component of their national development agenda:

- Providing national policy-makers with tools of analysis, comparative information, statistics and best practices in TVET delivery models
- Conducting international, regional and sub-regional meetings for policy-makers, professionals and researchers to exchange views
- Identifying the factors that determine the quality and relevance of TVET with a view to improving its effectiveness, and establishing assessment standards and systems to ensure that TVET is provided in line with international standards.

Assisting Member States' institutional capacity-building

UNESCO will undertake the following activities to strengthen TVET institutions' capacities in research, development and training:

- Providing guidelines and supporting national and regional activities for the preparation of TVET teaching and training personnel
- Assisting the Member States to use information and communication technologies as a tool for teaching and learning
- Enhancing the ability of Member States to transfer, adapt and customise programs and curricula, and assessment and evaluation techniques to local needs.

Enhancing international co-operation

The program will aim to launch major initiatives towards transforming the delivery of technical assistance and fostering joint action and common approaches by the international agencies in their support of TVET by:

- Establishing close co-operation with other United Nations agencies, donor institutions, development banks and NGOs
- Initiating international events that would draw public attention to TVET
- Advocating TVET as an integral part of the development agenda of bilateral and multilateral donors and financial institutions.

Implementation

The Program will be implemented by UNESCO Headquarters (Education Sector), relevant field offices, particularly those in Bangkok, Beirut, Dakar and Santiago, and a new UNESCO International Centre for Technical and Vocational Education and Training in Bonn, Germany.

The current UNEVOC Network will be transformed into an international framework for common support and co-operation in TVET, and each UNEVOC Centre will be encouraged to strengthen national networks. UNESCO will confer the title of Regional Centre of Excellence on a few selected UNEVOC Centres to facilitate regional co-operation, and will support these centres in their networking and program activities.

To achieve these outcomes, it must be recognised that UNESCO cannot act alone and that 'while UNESCO is the leading agency in the United Nations System in the field of education, many other intergovernmental and non-governmental agencies also deal with various aspects of education and training. In planning and implementing its program of technical and vocational education, UNESCO will seek to develop close co-operation with other partners giving the program an interagency character…(for example) UNESCO and the ILO have agreed in principle to formulate a joint policy framework in technical and vocational education and training with the goal of strengthening the currently ongoing co-operation between the two Organisations in this field'. (UNESCO 1999: 33)

ISSUES THAT NEED TO BE ADDRESSED

The development of the UNEVOC Network is a strong beginning to strengthen the role of TVET as a key component of lifelong learning, personal satisfaction and goal achievement for the world's population. The objectives and actions of the Network are also an excellent example of how cross border activities can be carried out to strengthen technical and vocational education systems. However there still remain key issues which need to be addressed and taken into account in the role that UNEVOC can play. These include:

- Adaption of TVET programs to meet the skills requirements, employment and development status of member countries
- Redesign of TVET programs to meet these needs
- Influence of socio-ecomonic conditions (UNESCO 1999: 89)
- Funding for TVET from various sources (government and non-government agencies, employer and learner)
- Overcoming barriers to participation in TVET
- Creating opportunities for participation by minority groups
- Skilling, and recognition of skills, of TVET teachers
- Recognition of the value of TVET
- Discrepancy between supply and demand
- Partnerships between education and industry
- Appropriate curriculum models
- Appropriate research (UNESCO 1999: 57–8)

CONCLUSION

Colin Power, immediate past Deputy Director General of UNESCO, provided a powerful message in his concluding state at the UNEVOC Congress in Seoul that is appropriate to conclude this paper. He stated that:

> We strongly believe that the provision of technical and vocational education and training aiming to prepare qualified technicians and skilled and semi-skilled workers should be an essential component of the development agenda of all countries. TVET is a bridge to the future, but there must be an employment road to which it leads, otherwise we create further problems. Thus we need not just a revitalised and more coherent TVET program, but a new vision for TVET and employment – we need new models of TVETE (technical vocational education and training and employment), linking education, training, employment and social welfare, nationally and internationally. (UNESCO 1999: 89)

What are your strategies to achieve this?

What will be your role in developing international partnerships?

How can you encourage international cooperation and subsequently strengthen TVET systems in your region?

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THE COMPETENCY OF CROSS-CULTURE OF EXPATRIATES IN THE MULTINATIONAL CORPORATION

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Index: Expatriation, multinational corporation, competency, cross-culture, globalization, business strategy, expatriate development

Abstract: Confronting the tendency of globalization, the human resource development of expatriation and the foreign workers in multinational firms act an important role for a global business strategy.

Furthermore, more frequently transactions and interactive trades between countries provide the employee more chances to encounter foreigner who works at same corporation.

Much literature has pointed out that many failures of expatiate resulting from the worker can not adapt to the host culture, or can not transfer their qualified capability and attitude to the oversea jobs.

In other words, the adaptability to the host culture is the essential factor to the success of expatriation. Contexts between different cultures maybe lead potential conflict and face unexpected shock. It is vital for multinational firms that ensure and enhance the performance and the productivity of workers from different countries. How to manage the cultural diversity and get the best practice or solution to cultural conflict are both important issues.

In this study, it will explore the factor and cause for successful expatriation. The paper will examine the key factors that affect the result of expatriation and provide as the reference to those multinational companies.

INTRODUCTION

Global organizations or multinational companies should shed their national identity, and highly adapt to changes in the trend of the environment, and perceive the global tendency that may affect the future. It is very sophisticated that global organization require not only the global business but also a different mindset and adaptable corporate culture.

We should understand the evolution from domestic company to global company, identify the essence for type of organization first, and then plan the human resource development strategy.

(Table 1)

Table 1

Corporate Cross-Cultural Evolution

	PHASE 1	PHASE 2	PHASE 3	PHASE 4
	Domestic	***International***	***Multinational***	***Global***
Primary Orientation	Product/ Service	Market	Price	Strategy
Strategy	Domestic	Multi-domestic	Multinational	Global
Perceptive	Ethnocentric	Polycentric or Regio-cetric	Multinational	Global/ Multi-centric
Culture sensitivity	Unimportant	Very important	Somewhat important	Critically important
With whom	No one	Clients	Employees	Employees and clients
Level	No one	Workers and clients	Managers	Executives
Strategic assumption	"One way"/ "One-best-way"	"Many-best-ways" equifinality	"One-least-cost-way "	"Many-best-ways" simultaneously

Because the tendency of globalization, multicultural training programs would address the diversity issues which impact on the performance of expatriates. (Table 2)

Table 2

The GI-LR Framework for IHR Strategy

Consistency Benefits of Global Integration

	Low	*High*
High	Ethnocentric HR Strategy	Geocentric HR Strategy
Low	Regiocetric HR Strategy	Polycentric HR Strategy

Differentiation Benefits of Local Responsiveness

Corporate globalization not only increases the importance for effective cross-cultural communication between employees and the contacts with people in other countries but also provide a worldwide view of employees' involvement in multinational business. (Table 3)

Table 3

International HR Strategies for MNC's

Need for Human Resource Consistency

	Low	*High*
High	Worldwide Human Resource Management	Umbrella Human Resource Management
Low	Adhere Human Resource Management	Decentralized Human Resource Management

Low ***Need for Human Resource Localization*** *High*

Sometimes, cultural values and beliefs conflicting may contribute to the misunderstanding regarding hospitality, politeness, and increase the friction between both parties.

Expatriation has become an important issue for an organization's globalization. In these days, many papers have focus on the high cost which resulting from expatriate failure caused by the hardship of adapt to the host culture.

Research Aims

The aim of this paper would examine the factors that expatriates' behaviors contributing to the success and failure. So the study would attempt to answer the following questions:

- *What factors contribute expatriate's success or failure?*
- *What types of behavior for expatriates' demonstration would make the expatriation more effective in cross-cultural setting?*
- *How to manage the strategic expatriation effectively?*

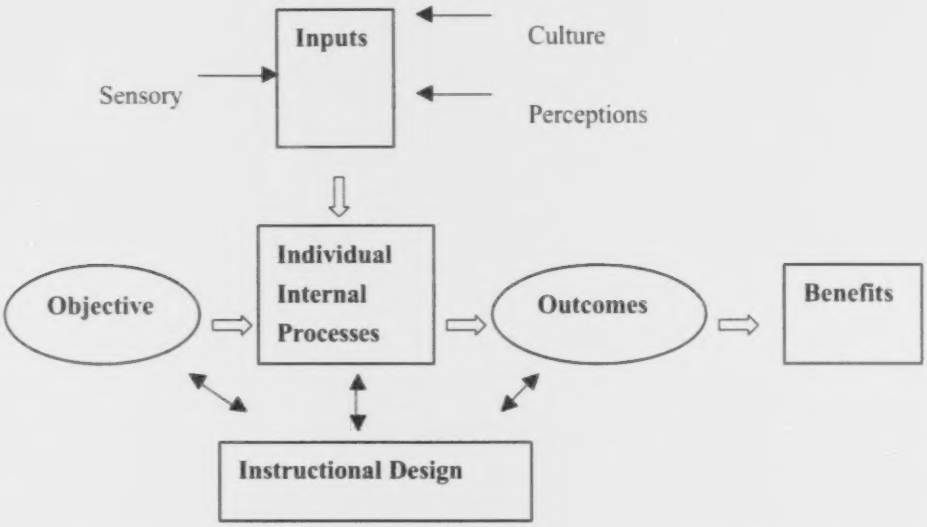
Expatriate Development

There are many types for global expatriate, including specific global management training specific country workshop global briefings that will impact the employee's performance oversea.

Multicultural business shows the traits of extraordinary opportunities and professional challenges, executives would get the qualified knowledge and skills to implement the strategies of corporation into operating in global markets. The effective expatriate would know the distinctions between international, multinational companies. They also would check the content of culture and learn management skills in analyzing and solving multinational issues (Table 4).

Table 4

Key Elements for an International Training System



Source: Peter Beck chi, Director of training, Word Environment Center.

Global Training Methods

There are several fundamental cross- culture training methodologies which the trainer could adopt. Adapted from Landis and Brisling (1983)

- *Information or fact-oriented training*: Trainee are presented via lectures, videotapes, and reading materials with various facts about the country in which they are about to live.
- *Attribution training:* The attribution approach focuses on explanations of behavior from the point of view of the native. The goal is to learn the cognitive standards by which the host-nationals process behavior input so that the trainee can understand why the host-nationals behaves as they do and do and adapt his or her own behavior to match the standards of behavior in the host country
- *Culture awareness training*: The aim is to study the values, attitudes, and behaviors that are common in one's own culture, so that the trainees better understand how culture affects his or her own behaviors. Once this is understood, it is assumed that he or she can better understand how culture affects human behavior in other countries.
- *Cognitive-behavior modification:* The focus here is to help trainees link what they find to be rewarding and punishing in their own subculture and then to examine the rewarding and punishing structure in the host- culture. Through an examination of the differences and similarities, strategies are developed to help trainees obtain rewards and avoid punishments in the host culture.
- *Experimental learning:* The goal of this approach is to involve the trainees as active participants,

to introduce the nature of life in another culture by actively experiencing that culture via field trips, complex role plays, and cultural simulation.

- *Interaction training*: Here trainees interact with natives or returned expatriates to become more comfortable with host- nationals and to learn the first- hand experience of the returned expatriates. The methods can range from in-depth role-playing to casual, informal discussions.

Source: J. Stewart Black and Mark Mendenhall. A "Practical But Theory-Based Framework for Selecting Cross-Culture Training Methods," *Human Resource Management*, Winter 1989.Reprinted by permission form John Wiley &Sons, Inc

It is basic that trainer would keep the principle in mind and put into practice that "Go to the people, start with what they are, build on what they have. By the way, the trainer will go with participants, assist them in their new way. To ensure all interventions will get from an aspect of mutual respect.

The global organization and executive expatriate

In global organization The executive expatriate should deliver new patterns of information about the world, and know the important content of overall political, social, economic, and cultural issue. To realize those content of issue would help expatiate executives define the competition. They own the traits which more adaptability, multinational thinking, and the capability to impel people toward a global vision. In the future, the expatriate executive would have more changes to deal with the unpredicted admit failure, exit with ambiguity, and examine the sense of theirselve.

The recently study exhibit that successful executives are more self-aware than their less successful counterparts. Many study confirm that the executive will need a new set of skills. The ASTD's Executive Development Seminar camp up with a set of current and future executive traits (Table) and a skill model for the new global executive (Table 5)

Table 5

Executive Traits Now and in the Future

Current Traits	Future Traits
All knowing	Leader as learner
Domestic vision	Global vision
Predicts the future from the past	Intuits the future
Caring for individuals	Caring for institutions and individuals
Owns the vision	Facilitates the visions of others
Uses power	Uses power and facilitations
Dictates goals and methods	Specifies Processes
Alone at the top	Part of executive team
Value order	Accepts the paradox of order amid chaos
Monolingual	Multicultural
Inspires the trust of boards and shareholders	Inspires the trust

The Criteria for effective Expatriate assignment

Successful expatriate assignment requires adjustment to the host culture. There is some distinct criterion committed to Successful expatriate assignment.

The capability to develop helpful relationships with host national colleagues, and establish a wider range of mindset patterns and behaviors. When international expatriate managers could carry the specific set of diversity into the strategic human resource management, then expatriate should demonstrate the capability to fit the particular cross-cultural condition and contribute to successful performance.

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PROVISION OF PROFESSIONAL TRAINING TO MEET GLOBAL PROCUREMENT CHALLENGES IN HONG KONG

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Index: Professional Training, Global Procurement, Hong Kong

Abstract: The technology today is so fast that quickly changes the traditional business process. Supply chain management is becoming the profession of the future – an extension of buyers' job. New professional education in purchasing and supply management should be demanded by Hong Kong's business world to maintain its status as a global procurement centre and a commercial window of China.

INTRODUCTION

Records show that as early as the thirteenth century B.C. purchasing played an important role in business. Nowadays, in the developed countries, it would be difficult to find an organisation, large or small, that does not have the purchasing function. Any savings you make on the purchasing side go straight to the bottom line *(BBC1 Business Breakfast, 3 June 1998)* so the successful implementation of purchasing principles can definitely have a positive impact on the overall success of an organisation. The technology today is so fast that predicting the future gets harder all the time. Purchasing and supply management is no exception - they are bound to face many changes. Recently, there are a number of notable moves of some giant companies signify the drastic changes in establishing electronic marketplace that might quickly evolve the traditional business process.

Moreover, it was pointed out by Vice Prime Minister, Mr. Wu Bang Guo in the Beijing International Logistics Conference held in November 1999 that purchasing and supply chain management would have significant growth in the 21st century. Starting from 1 Jan 2000, the National Tendering Law became effective in China, which was a milestone for China's professional practice of procurement. And targeted in 2020, the government purchase of China will be opened to APEC.

In the light of the foregoing, new professional education in purchasing and supply management should be demanded by Hong Kong's business world in order to maintain its status as a global procurement centre and a commercial window of China. Such new professional training shall impact on Mainland's supply chain development because its education infrastructure in this profession is not mature.

However, the educationists in Hong Kong still deem purchasing as an operational and narrow function, do not respond quickly to this speedy and dynamic changes in Hong Kong's business environment in training up 'business persons' in purchasing management. Therefore, the goals of this study were to investigate:

1. the job market and opportunities for purchasing personnel,
2. the implications of recent trend of supply chain globalisation,
3. the skills required from the view of employers and practitioners, and
4. how an enhanced vocational education is to be developed to cater for such vast development.

METHODOLOGY

The information was collected through the following four channels apart from literature review.

1. A job market survey had been done to study the market demand of the purchasing personnel by analysing the jobs advertised in different newspapers as detailed in Appendix 1.
2. 1442 questionnaires were sent to practitioners, industries and past graduates of purchasing courses (both part-time and full-time) from Aug to Oct 1999 to study their expectations of purchasing training. 145 were undelivered mail due to outdated addresses and 105 completed responses were returned and analysed.
3. 153 past graduates were interviewed over the phone about their career development and expectation of procurement training.
4. Key persons of professional bodies– The Chartered Institute of Purchasing and Supply (CIPS, UK) and The Institute of Purchasing and Supply of Hong Kong were interviewed of the trends of purchasing profession.

JOB MARKET AND OPPORTUNITIES FOR PURCHASING PERSONNEL

From the job vacancies in the newspaper listed in Appendix 1, it is found that:

1. Out of 108,085 vacancies, 19.6% fall in the category of purchasing (Appendix 2).
2. 74% of those purchasing jobs require Technical Institute (TI), F.5 and F.7 graduates. Needless to say, the employability of TI graduates is higher than that of F.5 and F.7 graduates who do not have any vocational nor professional training (Appendix 3).
3. Chances of advancement in career are available for purchasing personnel and the salary ranges for different positions are satisfactory. However, merchandisers seem to have higher salaries than those work as purchasers and storekeepers have the lowest salaries (Appendix 4 and 5).

From our questionnaires and telephone interviews, it was found that the career development of our graduates was in line with our findings from the newspaper. There is a great demand of purchasing personnel and their prospects are flourishing.

1. Even in the economic downturn, 81% of our fresh purchasing graduates in 1999 could find their first jobs within one month (Appendix 6) and the starting salary was between HK$7,000 to HK$7,500 (Appendix 7). Some of their salaries have reached HK$8,000 to HK$8,500 after working for a few months. The salary range for the past graduates is from HK$7,500 to HK$30,000 and the median is HK$15,000.
2. 89% of the past graduates have been promoted to supervisory or managerial grade (Appendix 8). Examples of the posts they are holding are Assistant Supplies Officer in Government Supplies Department, Supplies Officer in Cathay Pacific, Purchasing Manager in Sun Generation, Senior Purchasing Officer in Hong Kong International Terminal and in Philips HK Ltd. 77% are still working in the purchasing and supply field but those 14% handling general administration have to take care of materials management duties such as inventory control and procurement. Therefore, strictly speaking, 91% of them are still employing their purchasing expertise (Appendix 9).
3. Apart from purchasing, our graduates are competent to work in other areas such as warehousing management, production and materials planning, logistics and marketing.

Therefore, in our curriculum design, we equip our students with multi-skills and prepare them to work in any function of the supply chain.

IMPLICATIONS OF RECENT TREND OF SUPPLY CHAIN GLOBALISATION

In the past few months, some giant companies of different industries have notable moves in their purchasing and supply functions such as Sears, Carrefour and Oracle have formed the first B2B online exchange for the retail industry (Appendix 10). The implications of those events are:

1. Fast Growth of e-commerce

   According to Gartner Group, the value of B2B e-commerce transactions in the Asia/Pacific, outside Japan, is forecast to grow at a compound annual growth rate of 155% from 1999 through 2004, and will reach a size of US$995.8 billion in 2004. The Internet will become the backbone of electronic purchasing. It will be used for purchasing transactions such as order tracking, funds transfer and receipt acknowledgement. Systems for low strategic value purchases will stress on electronic efficiency while the challenge will be using the information created by electronic commerce in a truly strategic fashion.

2. Speed up the development of Supply Chain Management

   The concept of SCM has been in operation for more than 20 years. It is only in the last few years that SCM-enablers and its technologies such as Electronic Data Interchange (EDI), product barcode labeling, Point of Sales (POS) scanning and Cross Docking have begun to be fully exploited to the benefit of consumer, vendor and retailer. The improved utilisation of SCM technologies and enablers can help us to improve inventory performance, reduce working capital, allow an improved return on assets by reducing the warehouse and storage space required providing appropriate replenishment. Inventory turns of two or four times per year are still very common but 'best practice' retailers can achieve more than 10 inventory turns, with a strongly positive impact on their financial performance.

3. Lots of opportunities in SCM

   'According to the export supply chain management road map study commissioned by the HKANA, through implementation of the supply chain management the export industry has the potential to save HK$9.2 billion… businesses were reminded that use of supply chain ideas is still relatively immature in Hong Kong and that much needs to be done.' *(South China Morning Post, 19 May 2000)*. The same SCM survey indicates the major barriers are mainly due to lack of training and cultural problems. Comparatively, 'lack of technology' is the least serious problem that can be promptly improved by more capital investment (Appendix 11). However, much more effort has to be spent to change one's mindset and vision.

4. Reduction of head counts in tactical purchasing

   Despite the encouraging figures from our research, in the long run, as tactical purchasing becomes more automated, head counts in purchasing departments will be reduced. However, according to the research paper 'The Future of Purchasing and Supply: A Five- and Ten-year Forecast', structural purchasing departments will not be eliminated and supplier evaluation and development will remain in-house. That means the education and training provided should enable our students to acquire a much greater degree of professional skill than may have been sufficient in the past.

Summarising the four points above, we can forecast that Internet marketplaces with dynamic pricing will reduce the sourcing and negotiation effort and will make it easier and cheaper for anyone to buy. Desktop Internet catalogues will put purchasing in the hands of user. More and more companies will set up private, supply orientated virtual networks through which they can access, develop and manage their suppliers and their suppliers' suppliers. The more of the network that becomes mapped, the more risk and behaviour can be predicted. The challenge for supply, or network managers is to control risk prevention, but to tune the network for optimum performance. By mapping supplier capacity across the whole of the supply chain, purchasing staff will be able to identify opportunities for process rationalisation and gain a better realisation of planning effectiveness. They can tune their networks to perform more effectively. It will be important for purchasing and supply management staff to recognise that they are co-ordinating activities and services, instead of buying goods.

SKILLS REQUIRED FROM THE VIEWS OF EMPLOYERS AND PRACTITIONERS

Per Appendix12 and 13, it is interesting to discover that:

1. Our graduates, who are less experienced and greatly involved in routine purchase rank 'negotiating skills' as the number one skill whilst their bosses think 'purchasing knowledge and concepts' and 'analytical ability' are more essential. It is because as noted in the trend of supply chain, purchasing people will be involved in partnering arrangements. Although negotiations will not become any less important, the nature of them will change. Instead of heavy reliance on emotions and 'heated' debate, the focus will be one 'win-win' situation especially in the supply chain; the goals will be to establish winning relationships that result in lower total costs.
2. There is a great disparity in computer literacy as well, about 85% of employers requires require skills but only 54% of graduates share the same feelings. It is probably due to the demand of management information and the efficient operations from senior staff.
3. Bosses are more demanding than the subordinates since most ofthe scores given by industries are higher than those given by our graduates.
4. All the training areas are ranked far above '3' except 'Civic Education', which is scored as '2.94'. High scores of above '4' evidence the significance of English and supply concepts.

HOW AN ENHANCED VOCATIONAL EDUCATION IS TO BE DEVELOPED TO CATER FOR SUCH VAST DEVELOPMENT

The primary role of IVE in purchasing education and training is to provide students with a basic understanding of purchasing. Partnership with industries not only is a must to keep our purchasing training competitive but also facilitates the arrangement of industrial visits, talks and forums, attachment and research projects.

The shift of Hong Kong towards service based activities has increased the need for development of certain generic skills, which are fundamental to nearly all occupations, and are required in addition to more job specific skills. These include:

1. language capabilities, particularly in English and Putonghua,
2. IT skills, involving familiarity with the use of relevant computer software, and the implications of continuing development of hardware and telecommunications, and
3. development of what may be described as a service culture.

There is an external force to drive the change as well. Recognition by professional bodies is ranked highest in the expectations of purchasing courses because purchasing is not widely recognised as a 'profession' yet. Professional recognition not only upgrades the status of the course but also increases the employability of graduates (Appendix 14). Therefore, linkage with professional bodies is essential and those professional bodies should be extended to the ones with international status. It is unavoidable that the curriculum design is influenced by these bodies' examination syllabus.

Learning is no more limited in classrooms. Visits, industrial projects, talks and forums, attachment

programmes are effective teaching methods too. Through those non-classroom activities, students will have the opportunities to learn project plans, questionnaire design, data collection and hypothesis testing to obtain insights in business situations. They are also encouraged to use computer applications for decision making, illustrating concepts and principles and presenting results of their study.

CONCLUSION

The skills required by the purchasers in the 2000 can be categorised into three areas:

1. enterprise (having a good understanding of the overall business)
2. interpersonal, and
3. technical.

That means that purchasing professionals must be essentially and interpersonally competent and have a good grasp of the total enterprise. It is the challenge for the trainers to develop education and training programmes that will allow purchasing professionals to acquire the appropriate knowledge and to develop the right skills for coping with the dynamics of the business world.

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Appendix 1: Source of Information *

Newspaper	Weekday	Total no. of publications	Total no. of jobs	Duration
Career Times	Fri	17	24,637	1/10/99 – 28/1/00
SCMP	Wed & Sat	34	23,246	2/10/99 – 29/1/00
Job Market	Tue & Fri	33	28,419	1/20/99 – 28/1/00
Recruit	Mon & Fri	28	25,301	1/10/99 – 31/1/00
Ming Pao	Wed & Sat	34	6,482	2/10/99 – 29/1/00

* The data was collected by the students of IVE (ST) studying Diploma in Purchasing and Stores Supervision

Appendix 2: Distribution of Job Markets

Purchasing	19.6%
Administration	14.1%
I.T. & Engineering	23.3%
Accounting	9.2%
Marketing & Sales	20.9%
Production	4.6%
Others	8.3%
	100 %

Appendix 3: Qualifications Required for Purchasing Jobs

F.5 or above	35.1%
F.7	16.7%
Graduates of Technical Institutes	22.2%
Degree holders	8.7%
Others (Not specified)	17.3%

Appendix 4: Working Experience Required for Various Positions

Years of Experience	Job title	Percentage
1 – 3 years	Shipping clerk, Assistant Merchandiser, Purchasing Clerk	34.7%
4 – 6 years	Buyer, Merchandiser	38.1%
7 – 8 years	Senior Buyer, Senior Merchandiser, Purchasing Manager, Merchandising Manager	12.8%
9 – 10 years	Senior Purchasing Manager, Senior Merchandising Manager	12.3%

Appendix 5: Salary Range (HK$/Month)

Purchasing

Job title	1- 2 yrs	3 - 5yrs	5yrs or above
Assistant Purchaser	6 – 10 K	7 – 13 K	9 – 15 K
Senior Purchaser	8 – 12 K	10 – 18 K	13 – 25 K
Purchasing Manager	/	15 – 20 K	18 – 35 K

Merchandising

	1 – 2 yrs	3- 5 yrs	5 yrs or above
Assistant Merchandiser	7 – 9 K	8 – 13 K	10 – 15 K
Merchandiser	8 – 10 K	9 – 15 K	13 – 20 K
Senior Merchandiser	/	15 – 25 K	18 – 25 K
Assis. Merchandising Manager	/	15 - 25 K	20 – 25 K
Merchandising Manager	/	15 – 30 K	20 – 38 K

Warehousing

	1- 2 yrs	3- 5 yrs	5yrs or above
Inventory Clerk / Storekeeper	6 – 8 K	8 – 10 K	10 – 12 K
Stores Manager	/	10 – 18 K	15 – 20 K

Appendix 6: Length of Time for The First Job to be Offered After Graduation (for 1999 Graduates)

One month	81%
Within 2 months	11%
Further Studies	4%
Unemployed	4%

Appendix 7: Monthly Salary of Full-time Graduates

1999 graduates	HK$7,000 – 7,500
Median ('94 grad)	HK$15,000
Lowest ('97 grad)	HK$7,500
Highest ('92 grad)	HK$30,000

Appendix 8: Position Held (Official Title Held by Past Graduates from 1991-1998)

Supplies/ Purchasing Clerk/ Merchandiser	11%
Supplies/ Purchasing Officer/ Supervisor	63%
Assistant Supplies/ Purchasing/ Procurement Manager	15%
Supplies/ Purchasing/ Procurement Manager	11%

Appendix 9: Occupations of Past Graduates (1991 – 1998)

Purchasing	70%
General Administration	14%
Stores / Materials planning & Control	7%
Sales and Marketing	5%
Others (Students, Catering)	4%

Appendix 10: Fourteen Cases of Recent Moves in Purchasing and Supply Functions

Industry	Companies	Contents
1. Retailing	GlobalNetXchange between: Sears (U.S.) Carrefour (Europe) Oracle (largest provider of software for e-business)	- First global B2B online exchange serving the retail industry which will significantly reduce their purchasing expenses and greatly enhance supply chain efficiencies with their trading partners - Initially focuses on $80 billion supply chain purchases from 50,000 suppliers, partners and distributors - Serves 11,290 stores in USA, Latin America and Europe -
2. Retailing	Partnership between: Kingfisher (UK) Marks & Spencer (UK) Tesco (UK) Albertson's (US) CVS (US) K-Mart (US) Safeway Inc. (US) Target (US) Auchan (France) Casino (France) Royal Ahold (The Netherlands)	- Handles 100,000 suppliers, partners and distributors - Serves over 300,000 stores of combined sales of over Euro 300 billion - Investment amounts to Euro 100 billion in the first few years

Industry	Companies	Contents
3.Retailing (Convenience Stores)	RetailersMarketXchange between: Chevron (US) McLane(US-subsidiary of Wal-Mart) and Oracle	- Serves US$200 billion convenience store industry
4. Aerospace and defence	JV between: Boeing Lockheed Martin BAE SYSTEMS and Raytheon	- Based on the Commerce One MarketSite Portal Solution, powered by Microsoft - Global sales > US$400 billion - Serves 37,000 suppliers, hundreds of airlines and national government - Total procurement outlay >US$71 billion -
5. Aerospace	Airbus Industrie's Material Support Internet	- As of 4 April 2000, 120 airlines that regularly access with the many other services provided on this site could also use e-commerce to order spare parts in real time
6. Aerospace	GE Aircraft Engines	- Launches several web sites that will connect commercial airlines to suppliers and customers over the Internet - Allows users to order and search for parts, check the status and maintenance of their engine parts, view detailed pictures of their parts while they are in repair, receive up-to-the-minute service bulletins
7. Thermo-plastics	JV between: DuPont Dow Chemical BASF Bayer Celanese unit Ticona	- Serves US$50 billion market for plastic injections moulders - Initial investment of US$50 million
8. Automobile	JV for on-line car-parts exchange between: General Motors Ford Daimlerchrysler Oracle	- Combined purchase > US$160 billion
9. Government	Strategic alliance between: American Management Systems Inc and Freemarkets Inc.	- E-empower public purchasing

Industry	Companies	Contents
10. All	Strategic alliance between: Cable & Wireless HKT and Oracle	- Launches B2B electronic marketplace across a broad range of industries and their buying organizations and suppliers in Greater China - Invests >HK$400 million over the next three years
11. Logistics and transportation	Global Transport eXchange between: Portsnportal.Com, the e-commerce group of Hutchison Port Holdings and Baltrans Holding Ltd.	- Serves >2,300 shippers - Using Arena Technology - E-commerce marketplace for buyers and sellers of logistics and transportation to meet and transact
12. Government	Government Supplies Department of Hong Kong SAR	- Started Electronic Tendering System (ETS) on 7 April - Annual subscription fee HK$800 or paying a charge of HK$20 each time - Contracted out ETS to Computer & Technologies International Limited - Number of suppliers will increase from 15,000 to 16,000
13. Government	Office of Government Commerce (OGC) of UK	- Came into full operation from 1 April 2000 - Provide a central resource of procurement skills for departments and set strategic framework within which departments operate - Target at saving 1 billion pound sterlings by the start of 2002 - 90% of all high-volume, low-value routine procurement to carried out electronically by 2001 - 50 staff in London HQ, 75% professionally qualified by April 2000
14. Government	Government Procurement of China	- National Tendering Law was effective from 1 Jan 2000 - Shanghai appointed 403 procurement specialists as consultants to work out and advise governmental purchases in April 2000 - Formulate a policy and long-term plan for the purchase in 2000 - Target to open governmental purchase to APEC in 2020

Appendix 11: Barriers for Implementation of SCM

No information sharing	67%
Lack of vision	58%
Lack of skills	57%
Lack of training	57%
Lack of technology	43%

Appendix 12: The Preferred Skills that IVE Students Should Attain

Skills	Graduates	Industries
Negotiation Skills	89.1%	84.9%
Purchasing Knowledge and Concepts	78.3%	93.9%
Analytical Ability	73.9%	90.9%
Interpersonal Skills	65.2%	78.8%
Computer Literacy	54.4%	84.9%
Language Proficiency	54.4%	66.7%
Others	10.9%	18.2%

Appendix 13:The Rating of Importance of Different Training Areas

5=Very Important and 1=Least Important

Purchasing and Supply	4.64
Materials Planning and Management	4.32
Language and Communications (English)	4.03
Information Technology Applications (EDI, MRPII, ERP etc)	3.90
Legal Studies	3.83
Industrial & Commodity Knowledge	3.57
Other management studies (e.g. Marketing, Finance etc.)	3.57
Chinese Language and Communications (Putonghua)	3.48
Civic Education	2.94

5=Most Adequate and 1=Least Adequate

1. Arrangement of the external recognition by purchasing professional bodies (e.g. The Institute of Purchasing and Supply of Hong Kong and The Chartered Institute of Purchasing and Supply, CIPS UK)	3.93
2. Method of instruction: lectures, role plays, discussions and case studies	3.90
3. Exploring of experience by hiring expertise with subject related experience	3.90
4. In-depth specialised subjects in Purchasing and Supply (e.g. Legal Framework, Purchasing Strategy etc.)	3.90
5. Industrial projects by students	3.80
6. Talks/ Forums by practitioners	3.77
7. Exploring of experience by local industrial visits	3.76
8. Design for external professional examinations	3.67
9. Attachment programme in industry	3.43
10. Exploring of experience by overseas industrial visits to China, Taiwan and other Asian countries	3.34

FROM 20TH CENTURY EDUCATION AND TRAINING TO 21ST CENTURY SKILLS ENHANCEMENT

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Index: Lifelong Learning, Global Learning, Corporate Universities

Abstract: This paper examines the impact of ICT on the evolution of the learning process, in particular, the way that 'passive' education has adapted to become more 'active' participative learning. The growth of corporate learning accelerated by developments in ICT is making a major contribution to this evolutionary process and is posing various problems for traditional educational institutions.

INTRODUCTION

When future historians come to give an account of the beginning of the 21st Century, they may well describe it as the 'learning revolution', or the 'information age', the time when rapid technological development resulted in fundamental changes in work, leisure and lifestyle. Throughout the world, countries are now recognising the urgent need for positive action to enhance the skills and competences of their workforces, a movement that requires a radical reform of education and training systems. Employers are demanding higher levels of skills amongst employees as the 'job for life' disappears, with career patterns becoming more unpredictable and many individuals increasingly taking greater responsibility for their own personal development. It has become clear that in order to cope with this new age of uncertainty, the expansion of education and training along traditional lines would be not only too slow, but also too cumbersome and costly. Traditional methods of teaching and learning are unlikely to be adequate for the skills which will be necessary for the workforce of the future. Already, the business community has made it clear that any expansion of education and training does not mean more of the same. Educators have been challenged to think again about the meaning of a good general education - the skills and abilities of the best industrialists, barristers, journalists and civil servants. At the heart of the debate is the idea that a producer-led system should change to become (at least in part) user-led. Student demand and employment needs should take their place beside academic judgements to determine both the content and standards of courses.

A LEARNING REVOLUTION

The emerging importance of the value of learning, together with developments in technology, are resulting in a new approach comprising learning, not just from pre-packaged courses delivered in a traditional format, but also of combinations of skills, specified by individual learners and at the times and places convenient to them. Many companies, universities and colleges are now taking steps to implement this new approach through innovative arrangements for learning in the workplace, at home and in community-based locations. Such efforts are strongly supported by the availability of new technologies such as electronic networks and multi-media programmes which now make it possible to introduce improvements in:

- fitness for the purposes and needs of the learner
- accessibility of learning opportunities in terms of time, place and pace
- quality of learning materials and interaction with tutors
- cost effectiveness of provision

Economic and technological change therefore, sets four challenges for those of us involved in lifelong learning:

- creating a greater demand for learning
- widening participation in learning
- enhancing the skills of the workforce
- modernising the supply of learning

FROM EDUCATION AND TRAINING TO LEARNING

Traditional approaches to education and training are passive in nature, involving the teacher who is perceived to be the source of knowledge, conveying facts and figures to the learner with progress assessed by examinations or tests. This codified or 'know what' approach to learning, whereby progress is assessed by the ability to recall facts, has been a feature of formal education systems for the last two centuries. An additional feature of the traditional approach has been that one must or should choose between an academic or vocational course of study after the end of compulsory schooling. An academic education tended to mean study that is theoretical. By contrast, vocational education has meant learning that is practical, work related, specific or narrow, implying the achievement of specific skills or knowledge. It goes without saying that academic education has traditionally carried a higher perceived value than vocational, with the result that the contrast between academic and vocational is imprecise and value laden. Today, the distinction is no longer useful as it becomes clear that the characteristics of work based training and academic education are converging.

Specific knowledge quickly becomes obsolete as the context in which it is applied changes. For this reason, we are seeing a shift in emphasis to continuing education (or lifelong learning) as highly skilled employees and professionals seek to cope not only with technological advance, but also with changes in their regulatory framework.

The new world of education and training is complex and fast moving, including amongst its innovations an expansion of commercialised learning. Such developments incorporate the growth of corporate education, 'for profit' training and 'on-line' delivery, accompanied by a significant increase in the demand for higher education and the introduction of market mechanisms to the public sector. Whilst Corporate Universities exist predominantly in the USA (there were 1,600 in 1999), the numbers in Europe are currently small although it is predicted they are likely to grow in the next few years. The focus of activities in many Corporate Universities tends to be narrow, skill-focussed and lacking in links to academic research. Learning tends to take place in bite-sized chunks, providing rapid and regular updating of skills and competences. In general, Corporate Universities place increasing emphasis on the use of technology to deliver training in formats that involve short and intensive study periods. According to the UK report 'Learning for the Twenty-First Century' (1997), Corporate Universities are associated with three broad categories of learning:

- task specific or job related (to improve the efficiency and productivity of the workforce)
- parallel and transferable skills (to create a more flexible workforce)

- personal development (to provide the knowledge and skills to enable individuals to make employment and career changes and to create opportunities for personal fulfilment)

The report argues that effective learning in a corporate environment will only take place where there is recognition of the contribution that each of these types of learning can make both to business success and individual development.

GLOBAL LEARNING

One of the most important consequences of the emergence of Corporate Universities is the development of what is now called 'global learning' to indicate developments which cross the traditional boundaries of colleges and universities. These boundaries are being gradually eroded by commercial learning enterprises in a variety of different ways:

a) **Physical**: the term 'extra-mural' was originally used to describe courses which took place beyond the institution's geographic area. Today, terms such as these are becoming increasingly meaningless as institutions like the UK Open University, with over 30,000 students taking courses overseas, are making the idea of a physical boundary meaningless. In Scotland, we have formed Scottish Knowledge, an internationally recognised distance education Company which has the backing of all 13 Scottish Universities, many Further Education Colleges and a number of leading commercial organisations. It exports university or college expertise in education and training and has recently signed a global e-university alliance with Shell International to give the Company's 96,000 employees across the world access to on-line education and training. Scottish Knowledge is currently working with a number of overseas institutions to establish Virtual Universities which have student enrolment targets over the next decade of more than 100,000 students. In May this year, Scottish Knowledge won a contract to set up the United Arab Emirates first Petroleum Education Training and Research Institute, to offer internet-based training courses across markets in the UAE, the Middle East, the Gulf and Asia. These modern mega institutions are not ivory towers, autonomous spaces isolated from the murky world of politics on the one hand and the rigours of the market on the other. Operating on a commercial basis, they are aware that the best method of financial success is to increase their share of the market by enrolling students from around the world regardless of geographical location.

b) **Type of student**: when I was an undergraduate, a student was someone aged 17 or 18 who had just left school with a batch of Certificates which carried the entitlement to embark on a university course. Today, this 'front-loaded' profile of the student population is giving way to a much wider age range with many Universities having the majority of students in the 25 - 35 age bracket. It is becoming clear therefore, that more and more people throughout the world are continuing their education after the compulsory phase as the need to maintain personal development and keep up with change at work remains a vital component of coping with modern lifestyles. At Strathclyde University we have a Senior Studies Institute to provide opportunities for people over 50 to continue their personal growth and intellectual development within a supportive educational environment. The Institute also conducts a number of inter-generational programmes designed to highlight the benefits which can accrue from the mixing of generations through summer schools and other mixed age educational programmes.

c) **Syllabus**: syllabus borders are also changing as a high proportion of today's students select courses which are designed to prepare them for employment. The expansion of courses in business, information technology, leisure, tourism and other vocational areas, is a reflection of a changing emphasis in the move away from 'pure' academic disciplines to courses which are a preparation for future careers. Thus, colleges and some universities would be well advised to develop syllabuses which include the development of those practical skills of hand and mind which are considered essential to the well trained graduate. They may be the skills of the market place or the board room, they may be the skills of the call centre or the electronic workshop; they will certainly include the skills of exercising judgement and of communicating that judgement clearly and unambiguously. The higher education courses in the future are unlikely to be limited to subject based single honours courses which have been so much a feature of education, certainly in Britain for the last century. Instead, there should be academic pathways of considerable lateral and longitudinal diversity to match the wide range of talents of a diverse group of learners. The skills of writing and speaking clearly in public, once regarded as essential, need to be restored and replace the traditional emphasis on information gathering and the recall of facts.

CONCLUSIONS

As we are continually encouraged to become a learning society, to work in learning organisations and to participate in lifelong learning, it is becoming apparent that education throughout this century will not survive in its existing format. Universities are currently being driven by radical change as they bow to demands from the student body for new ways of teaching and learning. In future, universities and colleges will need to innovate, to diversify and collaborate to a much greater extent than has happened in the past if they are to survive. Mega Universities, as described by Sir John Daniel, the Vice Chancellor of the UK Open University, are institutions with as many as 100,000 students enrolled at any one time. This year we have seen the establishment of the US Open University, an American version based on identical principles to the British institution. Other nations are establishing similar Mega Universities, relying on distance learning to recruit large numbers of students scattered throughout the world. These Mega Universities are posing a threat to smaller institutions in much the same way as many local shops have suffered with the growth of supermarkets. This changing scene raises issues for Universities which, in the future, are less likely to continue to be places where a body of knowledge is made available to young school leavers and more likely to be providers of flexible learning opportunities for a more heterogeneous student population, seeking access to education and training from leaving school to retirement and beyond. Students who have previously been disadvantaged by work schedules or family commitments, or by remote geographical location, now recognise that opportunities exist for part-time flexible study, incorporating distance learning and internet materials which, in many cases, supersede the quality of the face-to-face tuition of traditional educational institutions.

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REGIONAL INTEGRATION OF TVET SYSTEMS AMONG SMALL ISLAND STATES: CARIBBEAN INITIATIVES

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Index: Regional integration, vocational qualifications, developing countries, trends

Abstract: States in the Caribbean Community (Caricom) are exploring regional integration of TVET as a means of improving the quality of training to enable improved worker performance and labour market mobility of workers in the region. This involves reaching a consensus on (1) the basis for design of training programmes, e.g. the approach to standards, use of competency-based approaches, etc., and (2) the framework for recognition and certification of trainees/workers that facilitates upward mobility and lifelong learning. Current efforts to achieve regional integration are discussed with issues and problems highlighted for discussion.

INTRODUCTION

Globalisation has illuminated the need for countries to improve their VET systems as one ingredient for competitive, high performance firms and more competitive economies. Workers need to be trained to employer-defined standards, with more emphasis on flexibility, on working in teams and on problem analysis and problem solving. VET systems have responded with industry-led standards, new curricula that emphasize the new skill profiles, and recognition systems that certify competencies and articulate movement among levels and kinds of education and training experiences.

The Need for Integration

The members of the Caribbean Community (Caricom) adopted a common strategy in 1990 to improve Technical and Vocational Education and Training (TVET) in all the member states along common lines. The more advanced states, Jamaica, Trinidad & Tobago, and Barbados are now integrating their recognition systems within a common framework and the other members are being invited to participate in this regional recognition framework. In addition to recognition of competence there is a need for greater integration of TVET provisions to avoid duplication of effort and achieve economies of scale in areas like instructor training and production of training materials.

Along with the changes required by globalisation, within the Caribbean region the need for freer movement of labour among neighbouring and similar states collectively known as Caricom has emerged as a means to improve the flexibility of the labour market and widen job opportunities for Caricom nationals. Member countries have signed agreements allowing freer movement of skilled labour under new provisions for a Single Market and Economy (SM&E), but these agreements require a shared framework for recognition of occupations. At present, graduates of the regional university, the University of the West Indies, journalists, recognised professionals, professional athletes and entertainers enjoy such freedom of movement. These initiatives in TVET have potential to allow much greater scope for movement of skilled labour across boundaries.

Possibilities for Integration

The occupational competence recognition systems in various stages of development in Jamaica, Trinidad & Tobago and Barbados are similar with each using the British and especially the Scottish approach to recognition in the form of National Vocational Qualifications. In the nine Organisation of Eastern Caribbean States (OECS) countries there is interest in reforming TVET along lines consistent with the current regional integration. Furthermore, the 1990s have seen the emergence of National Training Agencies or National TVET Councils in five Caribbean countries (Jamaica, Trinidad & Tobago, Barbados, St. Lucia, and Antigua, with the last two in formative stages). All the countries express a desire for a standards-driven, competency-based approach already underway in three countries. The award of National Vocational Qualification in three countries can be converted into a Caribbean Vocational Qualification given sufficient co-operation by these countries. OECS countries would participate under an umbrella established jointly by the OECS Secretariat and the Caribbean Examinations Council (CXC).

The Framework for Regional Integration

The framework for regional integration includes a consensus as to (1) a Technical Operating Model, (2) agreement about the definition of Levels of Employment, and (3) agreement as to an overall Certification or Recognition Framework. The three charts attached as Appendices show the proposed framework now under consideration by the various countries. The framework includes a common approach to:

- Developing Occupational Standards based on input from employers;
- Developing Curricula: instructional design, curriculum guides, training materials, assessment methodologies;
- Defining Occupational Levels and corresponding recognition levels using a five level framework;
- Defining a Certification Framework that relates these levels to formal education and, loosely, to timeframes for work experience;
- Execution of a Memorandum of Understanding, and
- Establishment of a Caribbean Association of National Training Agencies (CANTA).

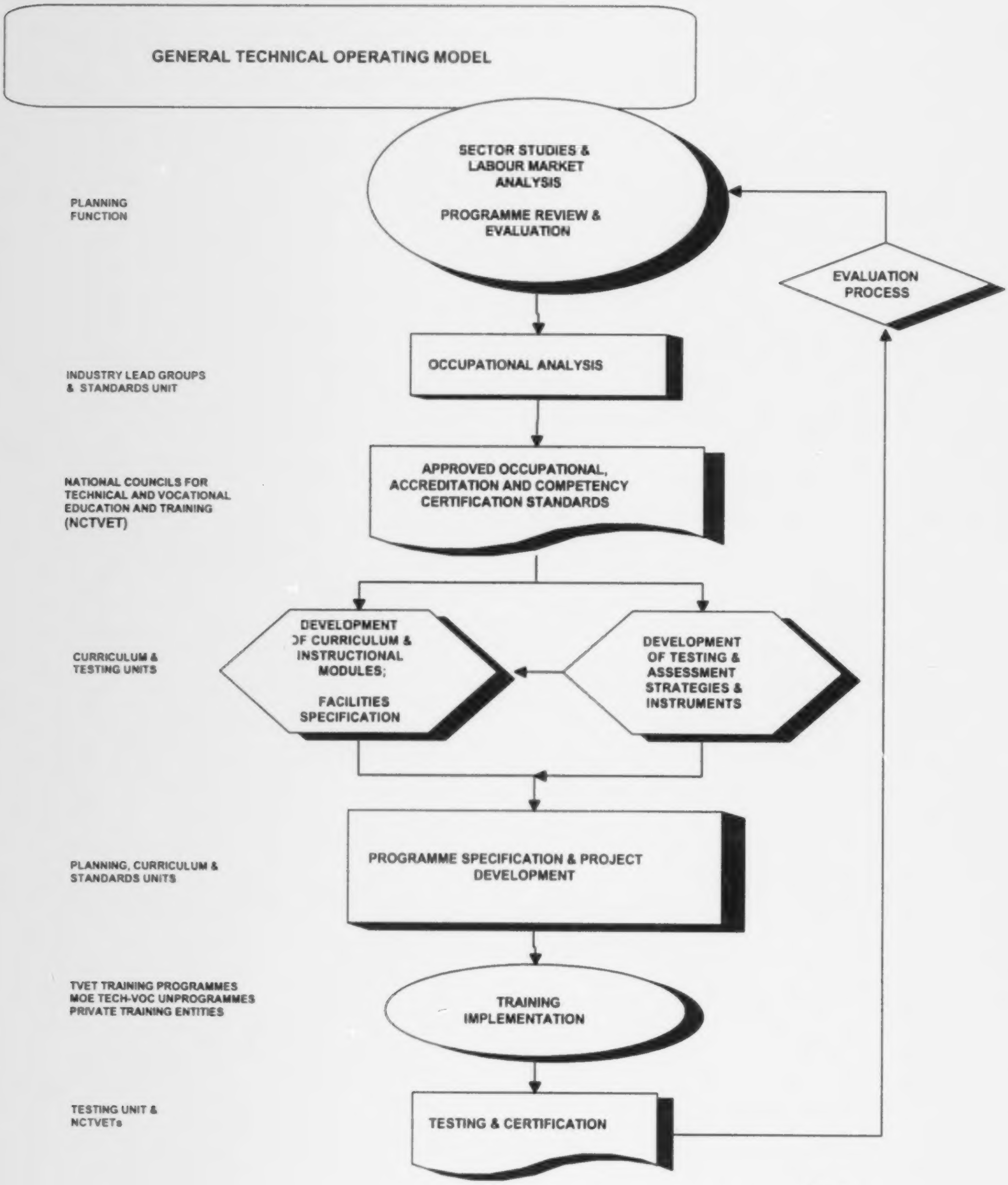
Issues and Problems in Regional Integration

The discussion of various issues and problems pertinent to the particular region can be generalised to other systems seeking to integrate recognition of qualifications. The main issues include:

- The dilemma of integrating Technical Education in secondary education into the vocational framework: there are barriers to articulation with a vocational training system with multiple and advanced levels and work experience requirements. Technical Education articulates well with the tertiary level via CXC, an academic qualification that includes a number of technical subjects, but these subjects are not defined based on employer standards and they terminate as secondary education qualifications without connection to actual occupations in the workplace.
- The problems of articulation between advanced levels of vocational training and tertiary education, and especially professional education: VET participants are not now recognised by the tertiary system and their academic qualifications revert to secondary-level experiences despite additional academic attainment from VET.

- Appreciation for certification among employers: Caribbean employers orientation tends to be traditional and academic. The hiring preference for entry-level jobs is biased in favour of traditional high schools and CXC subject passes. The currency of vocational training is rising, but not in all sectors.
- National approval and adaptation of extra-national standards: each state needs to have its own apparatus to adopt or adapt extra-national material to its specific requirements; this is a function of the training agency or council in each territory. Whether the Industry Lead Groups will be replicated in each country remains an open question, likely determined by the importance of a particular area of employment to member states.
- Means to resolve conflicting or inadequate standards: each country finds itself continually updating and improving standards. If a standard is shared that is viewed as inadequate by the receiving country, the idea is that all countries may benefit from improvements undertaken.
- Openness to other English-speaking and CARICOM countries to participate in the regional integration: there is a range of interest and readiness among the smaller territories to participate, but resources and political will are not always in place. The dominance of the academic and professional model in the region is a constraint to real understanding and acceptance of the VET model.
- Information sharing, Internet and web site linkages: sharing of material is one of the most important features of the co-operation. Jamaica has launched a website that will eventually be a repository for sharing information and the envisioned CANTA will build upon this experience.
- Labour Market Information Systems: planning within the region is hampered by inadequate LMI systems. This problem will become more noticeable as freer movement of labour is facilitated by the new arrangements.
- Research and evaluation: an slowly increasing amount of co-operation is planned in this area, especially in terms of evaluation of newly implemented curricula.
- Bi-lateral and multi-lateral co-operation initiatives: "donor assistance" is a main driver of initiatives in the OECS and influences activities in Jamaica. The German (GTZ) projects in the OECS and Jamaica, in particular, facilitate integration. The Inter-American Development Bank also assists several regional initiatives with training, HRD or VET components. European Union funds are being channelled into the OECS countries and being targeted at VET to help these economies diversify away from dependence on bananas. These financing streams support strengthening of national VET mechanisms consistent with the integration framework and establishing a CANTA.
- Finally, the integration of the Caribbean Examinations Council (CXC) into the recognition scheme presents both a significant challenge as well as an opportunity. CXC is an academic qualification that includes technical and vocational subjects. The TVET subjects do not relate to the standards-driven, competency-based model promoted by the VET-oriented entities, nor do they involve work experience. CXC expresses interest in merging these two kinds of qualifications, but this remains a major challenge to effect these changes within schools. Furthermore, the eventual merging of all qualifications pertaining to education and training into a single, unified framework is a longer-term objective. Such a framework is needed to establish a seamless, articulated education and training system that ultimately combines academic and vocational and technical education for the region. The framework also needs to integrate institutional and work-based learning experiences.

Attachment 1


GENERAL TECHNICAL OPERATING MODEL
PLANNING FUNCTION
SECTOR STUDIES & LABOUR MARKET ANALYSIS
PROGRAMME REVIEW & EVALUATION
EVALUATION PROCESS
INDUSTRY LEAD GROUPS & STANDARDS UNIT
OCCUPATIONAL ANALYSIS
NATIONAL COUNCILS FOR TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING (NCTVET)
APPROVED OCCUPATIONAL, ACCREDITATION AND COMPETENCY CERTIFICATION STANDARDS
CURRICULUM & TESTING UNITS
DEVELOPMENT OF CURRICULUM & INSTRUCTIONAL MODULES;
FACILITIES SPECIFICATION
DEVELOPMENT OF TESTING & ASSESSMENT STRATEGIES & INSTRUMENTS
PLANNING, CURRICULUM & STANDARDS UNITS
PROGRAMME SPECIFICATION & PROJECT DEVELOPMENT
TVET TRAINING PROGRAMMES
MOE TECH-VOC UNPROGRAMMES
PRIVATE TRAINING ENTITIES
TRAINING IMPLEMENTATION
TESTING UNIT & NCTVETs
TESTING & CERTIFICATION

OCT 99

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Attachment 2

OCCUPATIONAL CERTIFICATION

PROPOSED GENERAL FRAMEWORK FOR OCCUPATIONAL LEVELS

Parties to Memorandum of Understanding among Caribbean TVET Agencies

LEVEL I: **ENTRY-LEVEL: SEMI-SKILLED, APPRENTICE, SUPERVISED WORKER**

Recognises competence in a significant range of varied work activities performed in a variety of contexts. Work activities range from simple and routine to more complex and non-routine involving some individual responsibility and autonomy. Collaboration with others through work groups or teams may often be a requirement. Substantial supervision is required especially during the early months evolving into more autonomy with time.

LEVEL 2: **SKILLED WORKER: TECHNICAL/SPECIALIZED INDEPENDENT WORKER (LICENCED, ETC)**

Recognises competence in a broad range of varied work activities performed in a wide variety of contexts, most of which are complex and non-routine. Considerable responsibility, autonomy, control, teamwork and guidance of others are required.

LEVEL 3: **TECHNICIAN, SUPERVISOR, TRAINER / INSTRUCTOR**
Recognises competence in a broad range of complex, technical or professional work activities performed in a wide variety of contexts and with a substantial degree of personal responsibility and autonomy. Responsibility for the work of others and the allocation of resources are often a requirement. The individual is capable of self-directed application, exhibits problem solving, planning, designing, and supervisory capabilities. With additional specialised training can provide basic instruction.

LEVEL 4: **MASTER CRAFTSMAN, MANAGERIAL, ENTREPRENEUR, INSTRUCTOR TRAINER**

Recognises competence involving the application of a significant range of fundamental principles and complex techniques across a wide and unpredictable variety of contexts. Very substantial personal autonomy and often significant responsibility for the work of others and for the allocation of substantial resources, as well as personal accountabilities for analysis, diagnosis, design, planning, execution, and evaluation.

LEVEL 5: **CHARTERED PROFESSIONAL AND/OR MANAGERIAL**

Recognises the ability to exercise personal professional responsibility for the design, development, or improvement of a product, process, system or service. The award recognises technical and managerial competencies at the highest level and may be confined to those who have occupied positions of the highest professional responsibility and made outstanding contribution to the promotion and practice of their profession.

May 2000

Attachment 3

OCCUPATIONAL LEVELS, EDUCATIONAL QUALIFICATIONS AND TRAINING PROGRAMMES

PROPOSED GENERAL FRAMEWORK FOR CERTIFICATION

Parties to Memorandum of Understanding among Caribbean TVET Agencies, May 2000

OCCUPATIONAL LEVEL & CVQ LEVEL	EDUCATIONAL REQUIREMENTS TO ENTER TRAINING[1]	DURATION OF TYPICAL PROGRAMME[2]	JOB EXPERIENCE REQUIREMENT FOR CERTIFICATION	EDUCATIONAL REQUIREMENT FOR CERTIFICATION	TYPICAL TRAINING MODALITIES
Level 1 Semi-Skilled Worker, Apprentice, Entry Level Worker	Grade 9 equivalence[3], or 2 CXC 'O' levels or equivalent for some skills	3 months to 1 year full-time	160 hours in an approved Work Experience site	Grade 9 equivalence	Institutionally-based or on-the-job or via *co-operative training* (firms and institutions)
Level 2 Skilled Worker	Grade 10 equivalence or 2 CXC 'O' levels	1 year part time while employed in skill	Usually 2 years	Grade 10 equivalence	Co-operative training
Level 3 Technician, Supervisory, Trainer/Instructor, Entrepreneur	Grade 11 equivalence or 2 CXC 'O' levels	1 year part time while employed in skill; Trainer requires specialised study.	Usually 3 years	Grade 11 equivalence (Preferably 3 'O' levels)	Co-operative training
Level 4 Master Craftsman, Instructor Trainer, Entrepreneur	3 CXC 'O' levels or equivalent	1 year part time while employed in skill; specialised training for Instructor Trainer	Usually 4 years	Not specified, but amount of training viewed as equivalent to a tertiary matriculation standard	Co-operative training
Level 5 Professional	Tertiary or university admissions requirements	1-2 years of full time study with articulation agreements in place	Usually 4 years or more[4]	A university degree with professional courses	Set by professional bodies

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[1] "Educational Requirements" refers to the level of *actual* academic achievement of candidates (rather than grades completed) as evidenced byachievement tests These are viewed as minimum requirements to benefit from the training and to function effectively on the job

[2] Programme duration is based on the standards and the competencies, as well as target group characteristics, and is, therefore, flexible

[3] "Equivalence" recognises various clearly understood educational qualifications as agreed by the parties based on national recognition schemes

[4] Various professional bodies may have different requirements

THIRSTY HORSES AND PUBLIC WATERHOLES

Joyce Marie Turnbull
Director, Northern Territory Employment and Training Authority (NTETA)

Index: Employment and Training challenges, Indigenous communities Australia

Abstract: This paper deals with the challenges for vocational education and training administrators in the Northern Territory of Australia to respond to calls for action to address apparently opposing needs and forces. Issues considered include the incongruity of development theory and globalisation theory in the context of the Australian outback; the provision of effective training and employment programs to a largely traditional Indigenous population in remote Northern Territory communities; the clash between strategic planning in governmental and organisational contexts and the transmitted Indigenous world picture; the ambiguity of training for employment or the establishment of an enterprise culture in the remote Australian Indigenous context.

INTRODUCTION

Nature, they say, breaks the mould when she has created a masterpiece. This saying certainly holds true for the Northern Territory in Australia as there is probably no other political jurisdiction anywhere in the world with such a diversity and range of magnificent ecosystems and landforms. The Territory extends from the ancient and arid deserts of Central Australia through to the rich biodiverse tropical regions of Northern Australia. In the interval, lie some of the planet's grandest grazing properties and regions of mineral wealth.

The demography is even starker. The Northern Territory covers some 1,347,520 square kilometres and is home to approximately 190,000 proud Territorians. That's a population density of 1 person per 7 square kilometers, a statistic I would suspect that is hard to believe here in delightful Hong Kong.

Darwin is the Capital City wherein reside approximately 100,000 persons and about 1500km by road distant is Alice Springs with a population of another 26000 persons. Darwin is the seat of government and whilst the Northern Territory is not recognised as a state *per se*, it has self-government and sets its own policy agenda.

But I come not to sing the praises of one of nature's masterpieces but to leave you with some food for thought about some of the contradictions that surround public policy and the reality of providing VET opportunities for those who live outside the two main centres of the Northern Territory. In every sense, these are remote areas and are largely inhabited by Indigenous Australians. The remoteness is attended by some difficult educational opportunities and at times, restricted employment. In this paper, I want to reconcile these two encumbrances and public policy and also offer some notions of optimism for the future.

SETTING THE SCENE

Over 48,000 (27 % of the population) Northern Territory Indigenous Australians were counted in the 1996 Australian Census (Commonwealth of Australia 1997, p27). This count included both mainland occupants and smaller pockets living in the islands in the Arafura Sea to the North. The overwhelming proportion of Territorian Indigenous Australians (greater than 42,000) lives in areas that redefine remoteness. Some have lifestyles that are relatively undisturbed by European occupation whilst those who live in Darwin coexist in a major international city with Australia's most multicultural society. More than 50 distinct Aboriginal languages are spoken throughout the Northern Territory and it has been reported that up to a third of Indigenous Australians in the Northern Territory do not speak English as their first language (Commonwealth of Australia, 2000, p.67).

Literacy and numeracy attainment of the young is largely poor. In *Learning Lessons* (Northern Territory Government, 1999, p.17) it was reported that the average Indigenous Australian leaves school with the reading age of a 6-7 year old. Only 31% of indigenous students across the Territory achieved National Year 3 Reading benchmarks in 1998 and only 2% from non-urban schools (ibid. p.35). The latter cohort can be described as non-English speaking but it is a pointer to the dimensions of the challenges facing vocational education and training (VET) planners in their quest to equip Indigenous Australians for the new millennium.

Demographers assure us that the proportion of Indigenous Australians is growing due to higher birth rates than for the rest of the population and so we are faced with some issues that will force us to think laterally in order to provide real equity in VET.

PUBLIC POLICY

Its been clear for over a decade now that government interest in dealing with disadvantaged groups is more than academic and some real progress has been made in the Territory in providing special assistance to indigenous students. So much so that approximately 39% of students are now Aboriginal, well above the comparative proportion of Aboriginal people in the Northern Territory's population. A powerful set of arrangements has been established by my agency to make sure that community advice about what training is needed, how it is to be delivered and when is the driving force in funding programs for regional and remote community people. These arrangements, and strong encouragement and liaison have all been contributors to the dramatic turnaround in providing training to a very disadvantaged group. It is of course a proud statistic that gives a pointer to the attainment of equity targets but as I will hint at later, equity targets sometimes obscure the real picture of need.

The national scene is characterised by a focus on skills for employment and the training needs of industry rather than the needs of individuals as was manifest in Australia for the previous two decades. This post-Karmel focus has been a crucial element in attaining competitiveness in the global context but it has left some pondering the need to return to some elements of self-expression and creativity in training that was evident when Karmelism (shall we call it) ruled. The Northern Territory context might add some weight to this, although I hasten to add that those from more industrialised areas might have an alternative point of view.

Contemporary analysis of the changing demands of the Twenty First-Century (UNESCO, 1999, p4) highlight globalisation, changing technology and concomitant rapid social change as key features. I noted from this report a call to a *shift to human development needs and empowerment for effective participation in the world of work. Its focus must be on the needs and potential of the individual in society.* I've highlighted this last paragraph because it succinctly summarises the apparent conflict between public policy and reality in the Northern Territory.

So, we have local, national and international imperatives for planning and most planners diligently work towards aligning their efforts to these political imperatives. Public policy is quite explicit and most VET planners have firm guidelines to help them in their quest to align delivery to political imperatives. Let's now have a look at some of the issues that surround this public policy because there is some incongruity in development theory and globalisation in the context of the Australian outback.

A CURRENT THEORETICAL FRAMWORK FOR DEVELOPMENT

The past decade has seen an ebb and flow of political theories. At the moment it seems that economic rationalism is in the ascendancy in Australia so I will concentrate on some of the downstream effects resulting from this paradigm. I must add here that I'm not making any broad comment on any economic theory, just simply noting the results as applied to VET planning issues and highlighting any anomalies that occur from implementation of the theory in the practical world.

I think that it's fair to assert that economic rationalism likes (if not demands) to put value on outputs and outcomes. So, according to economic rationalism, any input into a system such as VET must have a measurable output. Not only should the output be measurable but it should also add value to the system that funded the activity. It's easy to see the rationale for this logic given the stated (government) objective of increasing competitiveness in a globalised economy. Bob Boughton (1999, 9) puts it nicely when he links human capital theory to economic rationalism. In this context, an economic rationale for the value of education is given, analysing it in terms of public and private investment. Human capital in this sense is the skill bank possessed by an individual and the arguments proposed in the theory seek to link national economic development with an increased national skill bank. I'm sure that in some sectors of development this model works very nicely.

Proponents of this theory argue that the potential contribution of an individual to society can be assessed by the domain of their skills and giving people skills to a job readiness is sufficient. The rest is up to them.

In contrast, other economic theories might have judged the value returned by training in terms of benefits to the individual or the society. Measurement of value is less concerned with extrinsic value (such as percent productivity gains) and more focussed on intrinsic value (such as contentedness, harmony and benefits to the community).

Human capital theory does not fit the Northern Territory VET context because it assumes a linear relationship between skills of an individual and their capacity to participate in the workforce. It disregards the unreasonableness of expecting a person who has close kinship to the land and close family ties to relocate to an unfamiliar, distant location and disconnect from tradition. It also ignores the reality of competition and of the proclivity of employers to choose a non-indigenous person in open competition for employment. Quite significantly for indigenous Territorians there is little attempt to establish equilibrium between the skills possessed and valued by indigenous people and those that might be prescribed as important to mainstream society. In fact, these tensions might be a major reason why all parties might have seen some well-funded programs as unsuccessful.

I need to remind delegates at this point that although the measurement of value might be precise in the national context, the measurement of skills is quite ambiguous. No account is made in a skill assessment of the level of traditional skills. These skills have helped indigenous people survive in one of the planet's inhospitable regions so they must have been quite significant. It is rather strange that care for the land should be devalued given the current emphasis in all sectors about encouraging environmental sustainability. It does seem that participation in training and preparation for job readiness are planning icons but this approach does at times tend to lend a somewhat paternalistic air to the effort, particularly when repeated calls for measuring outcomes are the norm.

Earlier on in this discussion I pointed to some recent evidence about poor literacy and numeracy levels, and they are. What is just as distressing to some of these communities is the loss of their traditional skills. There's quite an effort in some communities to turn around this decline but it does not quite conform (yet) to the national imperative of skilling for participation in employment. And so, some remote communities are copping a double hit in that their traditional skills are slowly being forgotten and their children are lacking basic skills to help them prosper in the modern society.

This also leads onto some thoughts about our successes in reaching so-called equity targets. Much of the effort is driven by national policy (Commonwealth of Australia, 1996). Once again though it has a rationalist argument as driver, relating Australia's future prosperity to improved economic performance and the involvement of all Australians. The same report (page 6) called for a shift in qualifications for Indigenous Australians so that 40% of participation were at Skilled, Trade and Para Professional levels by 2001.

We have been (mathematically) spectacularly successful in meeting participation targets but I do wonder if we should be re-thinking a strategy for our equity effort. If human capital theory is passe then what should take its place and how should we drive towards new targets? Indeed, what are the targets? Our legacy as a good manager must include stewardship. When we pass on the baton to our successors we must have ensured that our constituents are more able to cope with the future than when we received the baton.

Boughton (1998, p 6) argues that despite equity targets an improvement in traditional performance measures is unlikely to succeed. He makes the point that even if we could move our effort away from raising participation towards participation at skilled levels we would be still face the current problems. It is very difficult to overcome historical reasons of past education factors, the extreme underdevelopment of most aboriginal communities and the lack of sufficient funding (public or private) support for indigenous peoples' own development aspirations connected to the land and localities where they live.

Teasdale (1996) argues that a critical think in policy is needed leading to a fundamental shift from equity to Indigenous rights. These sort of decisions are the domain of the political domain but if this does evolve then we will see an increasing emphasis on Indigenous autonomy and self-determination in the management of VET programs.

AN ALTERNATIVE MODEL FOR DEVELOPMENT

Now that I've given the thumbs down to some current sacred cows then in all fairness I should propose an alternative development model for equipping Indigenous communities for their place in the modern community. Hopefully, if we can achieve some success in reducing societal inequalities then we might provide a little momentum in the journey towards overcoming the challenges that lie ahead.

Before I launch off into this I must make it plain that literacy and numeracy must remain the overriding imperative in schools. Current Northern Territory policy is very firm on this point. All Australians require these skills as a fundamental tenant of attaining and maintaining dignity in life. Similarly, I regard the acquisition of literacy and numeracy as a priority for funding by my agency where they have been missed at school. This will continue but I want us to think about the real development needs of remote communities assuming that literacy and numeracy requirements have been prosecuted. I would like us to put away for the moment the concept of participation targets and consider the needs of communities to survive in the 21st Century.

Here are the two dimensions of a new development model for your consideration.

Accessibility

We need to think through some of the issues surrounding accessibility to training and recognise that the concept of remoteness is largely artificial. In fact, many within "remote" indigenous communities would not regard themselves as remote at all but they have lived and worked with the land all their lives. This might give us some hints about their developmental needs and also of the ways that we might evaluate the effectiveness of our commitment.

The Human Rights Commission report (Commonwealth of Australia 2000, p.73) contends that accessibility has three dimensions and these are availability (free from discrimination in law and fact), physically accessible and economically accessible. Our developmental model might need to consider some of these issues but I'm confident that our current commitment and planning methodology have these under control. What's important though is that communities have access to programs that they see as important to the development of their community.

Community Self-Determination

There's little point about pursuing notions of full employment in remote areas when all the evidence that we have suggests that employment will contract but population will continue to grow. It might be more honest to acknowledge that whilst paid employment may not necessarily be the norm, people within a community can be fully occupied and increase in prosperity. The upsurge in ecotourism and cross-cultural tourism has to a large extent been influenced by indigenous participation. This in turn was assisted by communities that could draw on existing skills and add to their skill profile.

Community self-development might mean different things to different people and indeed I'm sure that the notion of development will be viewed differently by some indigenous folk than others. I guess that the point that I'm trying to make here is that we all have a sense of stewardship and long for our community to prosper so that our children have greater opportunities. It will be no different in an indigenous community.

It ought to be fairly easy for VET planners to come to terms with the notion of community development as they have considered regional development as their mandate for some time. Similarly, it should be easy for communities to consider themselves part of regional development as their development benefits the region at large. Scrutiny of regional Aboriginal development plans as compiled by regional Aboriginal and Torres Strait Islander Councils (ATSIC) show common development themes around health, housing and education. And these are of course some of the very elements that attract the attention of mainstream regional development planners.

Cultural and language immersion is a concept dear to the heart of many Indigenous Australians and part of the community self-development theme may assist in that cause. This is a much bigger issue than VET but I think that it needs to be acknowledged as an important driver in reform. The current development model offers some scope for incorporating cultural immersion themes, however, it will be argued by some that much more acknowledgment and effort should be forthcoming.

The issue of performance measurement in a new model is a little more esoteric but I have taken some comfort in reading some recent work (Commonwealth of Australia, 1997b, p.5). This work describes the principles of accessibility, flexibility, quality and responsiveness as worthy indicators of the suitability of effort. I agree.

AN ACHIEVEMENT

I've focussed much of the effort of this paper into an analysis of the reasons for a new approach and two important factors that might inform a new approach to planning leading to community development. During this, I've rather flippantly disposed of equity targets as inappropriate and hinted that real progress might come as a result of a much broader perspective.

Our role is much more than planning though and I think that it's important that I complete this presentation by referring to a project that has been a powerful influence on my agency, NTETA. NTETA has focussed on implementing programs that reflect the set of best practice principles for VET delivery with remote communities as defined by Djama and VET (1998). This is a report of a research project involving Batchelor institute of Indigenous Tertiary Education (then Batchelor College), the Northern Territory University and NTETA. Key components of this best practice are:

- VET delivery is culturally appropriate
- Partnerships are established between providers and Indigenous client enterprises
- Workplace learning is central
- Training responses are customised so that they are appropriate to indigenous training needs through flexible delivery based on workplace learning and networking between providers and indigenous enterprises
- Quality student support and learning management systems involve provider/client agreements, workplace learning, on-site and off-site trainers and tutors and interactive technologies

These principles are interconnected, and mutually reinforcing and mutually defining (Robinson, 1999)

CONCLUSIONS

As I ponder the future of our effort in assisting remote community development, I'm reminded of the proverb: "*You can lead a horse to water but you can't make it drink*". If the pool to drink from in VET is filled with an emphasis on skills for conventional employment and the training needs of industry using a very narrow definition of industry, then we should not be disappointed if many of the Indigenous clients of our system are reluctant to, or in fact, decline to drink the "*water*" as it does nothing for their thirst. I'm confident though that the responsiveness and resourcefulness of staff and the commitment of governments are sufficient to clear a pathway through which our Indigenous Australians can find dignity.

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ADAPTING THE SYSTEM OF CONTINUING VOCATIONAL EDUCATION FOR THE 3RD INDUSTRIAL REVOLUTION – EXPERIENCES FROM THE SWEDISH PILOT PROJECT WITH AVE[1]

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Index words: Advanced vocational education, Continuing vocational training, Information- and communication technology, labour market transformation.

Abstract: This paper analyses problems associated with adapting the system of continuing vocational education (CVT) to the rapidly changing Swedish labour market. The key question asked in the paper is how CVT is going to adapt to a labour market characterised by a growing IT-economy. The paper also presents empirical data from the pilot project in Sweden called *Advanced Vocational Education*. AVE is a new form of post-secondary education designed to meet changing technology and skill requirements. The paper concludes that AVE is a step in the right direction in decreasing the gap between demand and supply.

INTRODUCTION

The Swedish system of Continuing Vocational Training (CVT) has over the last five years been subject to a debate regarding its future content and performance. The reason behind the debate is the primarily problem of how to adapt to the rapidly changing labour market. Fierce international competition, flexible work organisations, together with a general trend of downsizing and outsourcing during the 1990s, helped to create a need for new skills and competencies.

One of the single most important factors behind the transformation of the labour market, is the fast and almost overwhelming evolution of information- and communication technology (ICT). The development, that started in the late seventies, and intensified during the eighties and nineties, to a large extent contributed to, a decrease in some sectors of the economy and growth in the sector of information services. The foundation for the evolution, besides an increasing openness to worldwide technological and economical shift, has been major national investment programs that support research & development and the necessary high technological infrastructure.

The purpose of this paper is that through compilation of available statistics indicators on macro- and sector level from the period of 1990 forward analyse one of the large problems facing the system of CVT and its adapting to the rapid changing labour market. The development of ICT in Sweden also gives the appropriate background when presenting results from the pilot Project with Advanced Vocational Education (AVE). The theoretical framework for the analysis is the economic-historical model that explains the process of labour market transformation in transitions between industrial revolutions.

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[1] The author wishes to thank Professor Jan Johansson, Research engineer Jonathan D. Stubbs and Doctoral student Marita Olsson at the Department of Human Work Sciences, Luleå Universtity of Technology for valuable comments on earlier drafts.

LABOUR MARKET TRANSFORMATION IN A THEORETICAL AND EMPIRICAL CONTEXT

According to the economic-historical model of explanation, the process of labour market transformation can be seen as a phase in the transition between two industrial revolutions (Magnusson, 2000). Every revolution has a fixed time length as its existence depends on certain characteristics of industrial production. These generally are performance, planning of work organisation in combination with social and economic conditions in society. The first industrial revolution occurred in Sweden with the introduction of mechanised industry in the middle of 18th century. The second revolution occurred after the Second World War, in the 1940s. In the second industrial revolution the main characteristic was massproduction with Tayloristic methods of work organisation. The transition to the third industrial revolution that we are in now in has it origins, according to the model of explanation, in mid 1970s. This model emphasises long-term changes as influencers. Those changes were; (1) Increasing international economic competition; (2) Changing preferences in the population away from streamlined mass-produced items to designed products reflecting different lifestyles and (3) Innovations and expansion of microelectronics.

Signifying the transition between the second and third industrial revolution is the setback experienced by established sectors of the labour market in terms of employment and economic strength. Competing with the old is a growing service sector with a high dependence on ICT. In Sweden, this development is been very visible where the numbers of employed in the sector of Agriculture, forestry and fishing during the period 1987-1999 have decreased from 4,0 percent to 2,5 percent[2] (Statistics, 2000b). In economic terms the percentage of GDP changed from 2,34 percent in 1980 to 2.09 percent in 1998. The same development followed in the sector of construction with a drop of 1,16 percent in level of employment. In terms of GDP, the sector of construction fell from 6,74 percent in 1980 to 5,00 in 1998 (Statistics, 2000a).

In terms of expansion is the sector of information services provides a remarkable example. The expansion has its roots in heavy investment programs financed by the government starting in the late seventies. For example, the state owned phone company, Telia, invested during the period 1992-1994 4,5 billion US $ in upgrading its networks and telecommunications systems (Statistics, 1993). In 1993 total expenditures on research & development amounted to 7.4 billion US $, which was equivalent to 3,3 percent of Sweden's GDP (Statistics, 1996). From the late nineties, the expansion has continued at a relentless pace. In 1998 total capital investment of ICT in Sweden amounted to six percent of GDP (ISA, 2000).

One of the most significant examples of the dividends that these investments programs have subsequently returned has been in the expansion of ICT. The ICT sector is defined as the sphere consisting of companies within the electronics industry and IT-related enterprises including mobile communication services (Statistics, 1996). A compilation with key figures relating to the expansion of the ICT sector under the 1990s is shown in table 1.

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[2] In comparison, the equivalent level of employment was in 1970 5,7 percent.

Table 1. Key figures on electronics industry and IT-related Enterprises. Year 1993-1997.

Branch	Electronics industry		IT-related enterprises	
Year	1993	1997	1993	1997
Companies	800	1 291	8 100	10 928
Employed	46 000	55 360	77 300	126 151
Turnover	57	136	86	237
Investment	2,3	*	4	17

Source: (NUTEK 2000; NUTEK 1996)* Missing data.

Altogether the ICT sector produced in 1993 goods and services to a value equivalent to 3,6 percent of the GDP (NUTEK, 2000). The expenditure for research & development for the year 1993 1.3 billion US $ for the electronics industry and 0,4 billion US $ for ICT-related enterprises. In 1997 the cost for R&D had expanded to 1.7 billion US $ for electronics industry and 0,5 billion US $ for ICT-related enterprises. Altogether the expenditures within the sector amounted to 16 percent of the total R&D in Sweden (NUTEK, 2000).

On a individual level, these national investment programs has resulted in that about 70 percent of the Swedish population having a computer in their homes today (Rembe, 2000). About seven percent of the Swedish working population are today working in telecommuting occupations with the help of ICT (NUTEK, 1998). In the end of 1999 about 56 percent of the Swedish population, which is about five million people, owned a cellular phone (ISA, 2000).

THE SWEDISH SYSTEM OF CONTINUING VOCATIONAL TRAINING

Over the years Sweden has developed a diversified system for provision of continuing vocational education and training (CVT), which includes sectors with a strong working life orientation. As a system, CVT is affected by changing supply-demand patterns that characterise the training market. According to a common definition (CEDEFOP, 1999) the CVT system until 1996 consisted of:

- Labour market training
- Vocational training within the framework of municipal adult education
- In-company training or staff training
- Short technical programmes at university level

The different components of CVT were, however, very slow responding to the fast development in working life as, for example, technical evolution that called for changes. A report commissioned by the Ministry of Education and Science (SOU, 1995) concluded that there was a need for a drastic improvement with regard to a higher degree of flexibility and swiftness by which CVT answers demands for skilled labour into relevant education programmes upon short notice. The report also concluded, which later European studies has confirmed (CEDEFOP, 2000), that it is not just a matter of increasing the technical skills. On the contrary, development of and flexible work organisations, globalisation and ICT, call for new and different methods for learning a vocation as well as the importance of personal skills. For example, the ability to work and communicate in a team, the ability to think in the abstract, and adaptability to work on a variety of projects at the same time.

ADVANCED VOCATIONAL EDUCATION

To respond to the new demands, in 1996 the Swedish government launched the pilot Project called Advanced Vocational Education (AVE). With AVE, which is a new component of CVT, one-third of course time is devoted to advanced application of theoretical knowledge at a workplace. The intention was that the courses should not be organised along traditional lines, but rather revolve around active workplace-based learning and problem solving in an overall educational context. The length of AVE course programmes ranged from 40 points up to 120 points, where one point is equivalent to one week of fulltime study. Courses were build around close co-operation between enterprise and various course providers such as upper secondary schools, municipal adult education, higher education, and commercial training companies.

During the period from August 1996 to September 1999, the pilot Project with AVE was evaluated. This evaluation which covered about 12 000 students in 200 different programmes was performed by a research group from Luleå University of Technology (SOU, 1999).

The programmes were divided into 12 different branches. The largest branches, with respect to the number of course programmes, were Manufacturing, Business, Tourism and ICT which together enrolled 72 % of the students.

Since AVE was (and still is) open to those coming directly from upper secondary school and those already gainfully employed wishing to develop their skills within a defined area, there was a slight difference in age between students attending AVE and students attending university studies. In AVE, the majority of students (52 %) were between 16 and 24 years old. For students attending university studies, the equivalent number was 48 %. In comparison with regard to sex the differences were similar. In AVE, 53 % of the students was men and 47 % women. For university, the numbers were in fiscal year 1997/98 58 % men and 42 % women.

ICT-PROGRAMMES WITHIN AVE

During the evaluation period, the ICT-sector was the largest of all with 46 different course programmes enrolling almost one-fourth (24 %) of the total student body. Depending on various definitions of IT-branches, approximately between 5 and 7 percent of the working population are employed within that sector, the volume of ICT-programmes at first glance seemed over-enrolled in relation to other sectors. The reason behind expansion was not due so much to the student interesting enrolling the programmes, as much directives by the government giving ICT-programmes high priority.

On an analytical level, the programmes were clustered into four different categories depending on the aim and scope. One category consisting of 16 course programmes was traditional and established systems- and software course programmes. Goals of those programmes were to meet demand for semiskilled workers. A second category was programmes educating for the new area of multimedia and Virtual-reality technology. The 14 course programmes trained the students in a broad introduction to and necessary skills for a future vocation as a Web-designer, producer of interactive CD-ROM, or DVD publications. A third category constituted of 10 course programmes training the students in computer knowledge on a very basic level. The courses were specialised into different sectors and trained students for well-established occupations (e g., data-entry).

A fourth category constituted of six programmes of a very advanced kind. The programmes trained for very specialised kinds of skills. For example, designing safety systems monitoring computer traffic on the Internet. Other course programmes within this category was advanced courses in Computer Aided Design and Computer Aided Engineering.

DEMAND FOR AVE-STUDENTS GRADUATED FROM ICT-PROGRAMMES

From a survey carried out six months after students graduated it appears that AVE has been favourable in terms of employment after course completion.

Table 2. Occupation six months after graduation.

Occupation	Employed		Continuing to universities	
Sector	**NR.**	**%**	**NR.**	**%**
Construction	28	80	4	11
Business	173	78	22	10
ICT	**142**	**78**	**12**	**7**
Agric./forestry	50	71	1	1
Food industry	8	44	0	0
Environment	28	58	14	29
Transportation	50	77	2	3
Manufacturing	177	76	12	5
Wood industry	19	56	2	6
Tourism	121	84	9	6
Care	25	66	1	3
Misc.	24	71	3	9
Total	845	75	82	7

Source: (SOU, 1999)

Table 2 show that of the former AVE students, an overall average of 75 % have been employed. Of the students that graduated from course programmes within the ICT-sector, approximately 78 % of the students were employed. Furthermore, 4 % of the students reported that they had started their own company, which gives a "success rate" of 82 %. The survey also conveyed that 13 % were unemployed and that 7 % continued to further studies at the university level.

CONCLUDING COMMENTS

AVE is an important contribution for the CVT system. The research results implicate that AVE in its first years has had a favourable outcome with regard to employment rate. One important explanation behind this is the active workplace learning instead for traditional classroom learning and close co-operation with industry designing the courses. For the students this means that they, at an early phase of their education, get the chance to meet potential employers. This is otherwise a common problem. The employers, on their hand, gives through interaction with AVE administrators, the opportunity to receive the kind of workforce, with regard to skills, that are demanded for.

There are, however, some problems with AVE, in terms of ICT courses, today. The relatively low skill level offered in AVE courses might be explained by the fact that there is no basic ICT education at the high school level in Sweden. This means that ICT education can only begin after a student has completed their basic high school curriculum. This is not an ideal state since AVE is supposed to be more advanced vocational education that can supply industry and commerce with workers having a relatively broad array of ICT skills and qualifications. There is a risk, that the students after leaving an AVE course must learn additional skills on the job as their qualifications do not precisely match with the skill requirements of industry. In the growing economy of today industry is willing to overlook skill deficits as long as the former students grasp basic skills and concepts. At this time industry is willing to do some training of new employees. Should the economy slow down it may well be that graduating students will find that their array of skills will not be viewed as adequate by potential employers. It is important to acknowledge that there are some specialised and advanced course programmes that already meet the criteria of flexibility and high skill level, but in regard to the fast economic and technological development described earlier, those few are only the beginning.

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A FLEXIBLE INVESTMENT: THE AUSTRALIAN VET SECTOR'S FRAMEWORK FOR APPLYING NEW TECHNOLOIES IN LEARNING

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Index: Flexible learning, educational partnerships, lifelong learning

Abstract: In 1999, the Australian VET sector developed a five-year strategic plan, Flexible Learning for the Information Economy: A Framework for National Collaboration in Vocational Education and Training 2000-2004. Known commonly as the Collaborative Framework, the plan is a fluid platform upon which the Australian VET sector can strategically plan for the use and expansion of learning technologies in training and industry. This paper will explore the Collaborative Framework not only as an integrated policy response to the emergence of new learning technologies, but also as a model of collaboration between governments and a bold experiment in cultural change within the VET sector.

INTRODUCTION

The role of government in the adoption of new learning technologies has often been limited to the provision of regulatory and infrastructure systems. It is an approach premised on the belief that the participation of government in substantive matters of staff professional development and online resources acts only to constrain the innovation and responsiveness of education services. The Australian vocational education and training (VET) sector has recently revisited this issue in response to concerns over the quality, consistency, cost and broad adoption of new learning technologies in the sector. Their response to the innovation / consistency conundrum are interesting in both policy and practice.

In 1999, the Australian VET sector developed a five-year strategic plan, Flexible Learning for the Information Economy: The Framework for National Collaboration in Vocational Education and Training 2000-2004. Known commonly as the Collaborative Framework, the five year plan is a fluid platform upon which the Australian VET sector can strategically plan for the use and expansion of learning technologies in training and industry. In articulating this role, however, the Collaborative Framework raises a range of questions about the role and challenges of government in planning for learning technologies:

- Can coherent technology policy emerge in a federalist government environment, and what are the implications for education policy planning and innovation?
- Is government involvement intrinsically at odds with innovation and the creation of a dynamic, responsive education system? What kinds of innovation and dynamism might emerge from government collaboration?

- How do the five goal areas of the *Collaborative Framework* interact to provide an integrated response to the emergence of new learning technologies? Why are they strategically important to the development and expansion of Australia's flexible learning capability?
- How might the *Collaborative Framework* position the Australian VET sector in a competitive global market, when previous attempts at federalist collaboration in education have been less successful? What makes this work where others have failed?

This paper will focus on these four questions, before turning to consider future iterations of governmental collaboration in the VET sector within and outside of Australia.

AUSTRALIA'S FEDERALIST SYSTEM OF GOVERNMENT AND ITS IMPACT ON VET POLICY

The need for a national collaborative approach to flexible learning in the VET sector is in part a consequence of Australia's federalist structure of government. The jurisdictional complexity of the Australian education sector, combining the Commonwealth government as well as eight separate State and Territory jurisdictions, has meant that VET policy has evolved in neither a systematic nor consistent manner. Indeed, States and Territories assumed responsibility for the majority of VET policy in their jurisdictions until 1987, when the Commonwealth developed policy platforms that for the first time directly linked VET with issues of national economic development and wealth (Mitchell, Robertson and Shorten 1999:107). A particular interest in national collaboration on flexible learning issues in VET did not emerge, however, until 1995, when a National Taskforce on Flexible Delivery was formed (National Flexible Delivery Taskforce 1996).

While the origins of a coherent policy framework for flexible learning in Australian VET can be traced to 1995, the consequences of inadequate planning were already apparent. States and Territories first began to expand their flexible learning activities in the 1990s, but this expansion occurred largely in isolation, with limited collaboration across jurisdictions. The most salient outcome of this atomistic approach was the lack of interoperability of many infrastructure networks, which resulted in increased service duplication, inefficiency and cost for States and Territories. Issues of equity and choice became paramount, with both industry and learners experiencing a restricted range of training market options. Against this background, the provision of VET services lacked genuine flexibility, and in its piecemeal development and delivery, offered little strategic or economic advantage to the nation. The need for a collaborative policy framework for the expansion of flexible learning services in VET was identified, but with this need, emerged a debate concerning the most appropriate model for cross-government collaboration.

CREATIVE INNOVATION AND THE ROLE OF CATALYTIC GOVERNMENT

At issue was the dilemma of how to promote the expansion and export of training services that utilise new learning technologies, without constraining the sector's innovation and responsiveness in a competitive global training market. It was clear that some degree of government support would be necessary to ameliorate the impact of expensive infrastructure costs. But it was also apparent that Australia's position in the training market was just as dependent on intellectual infrastructure as it was on cabling and satellite links. In 1999, the *Collaborative Framework* was developed to meld traditional notions of infrastructure, government regulation and facilitative support, with new and largely experimental approaches to the development of people, skills, and online services and content. It is a framework that reiterates the important catalytic role governments assume in working collaboratively together to encourage innovation, and to support the adoption of new learning technologies.

Central to this catalytic role of government is the importance placed on partnerships between key stakeholders within and beyond the VET sector. Most notably, cooperation between the VET industry and the private sector has brought new markets and enormous innovation to the public VET sector. These private-public linkages were not without precedent; in 1998, multimedia companies worked cooperatively with VET providers and governments to develop the *Toolbox* project, which produced online training programs for national Training Packages (Australia's nationally recognised courses of training). The *Collaborative Framework* sought to build on these successful partnerships, and while such cooperative activities introduce a degree of risk in policy and practice, the partnership model is designed as a facilitating mechanism for the provision of creative and innovative flexible learning solutions (EVAG 2000a:15).

SEAMLESS SOLUTIONS: THE FIVE GOALS OF THE COLLABORATIVE FRAMEWORK

The *Collaborative Framework* was developed by the VET sector in response to a discussion paper prepared by Australia's National Office for the Information Economy. This discussion paper was designed to address the expansion of the information economy in a diverse range of industry sectors in Australia, and the *Collaborative Framework* represents the VET sector's response to this call for an integrated strategic approach to technology issues.

The *Collaborative Framework* contains five goals, which were selected on the basis of their strategic importance for VET in Australia's transition to the information economy. These goals require a national collaborative effort if optimum results are to be achieved (EVAG 2000a). The goals are:

- Goal 1: Creative, Capable People
- Goal 2: Supportive Technological Infrastructure
- Goal 3: World-Class Online Content Development, Applications and Services
- Goal 4: Enabling Policies
- Goal 5: Problem-Solving Regulation

It is useful to briefly explore the scope and content of each of the five goals.

Creative, capable people: aims to accelerate Australia's transition to the information economy through developing the skills of VET staff in the use of flexible learning approaches (EVAG 2000b:7). The goal travels beyond conventional notions of professional development, to embrace a suite of online conferencing, business planning and research tools that reflect the breadth of experiences VET staff require to work effectively in flexible learning.

Supportive technological infrastructure: aims to provide affordable access to online training services for use by communities, learners and employers. The goal supports the use of advanced and interoperable communication technologies in the VET sector, to support the application of new technologies in both training and business processes (EVAG 2000b).

World-class online content development, applications and services: aims to maintain and expand the VET sector's share of the training market both in Australia and internationally (EVAG 2000b). A diverse range of initiatives support this aim, including the development of online training products, quality assurance supports, VET sector e-commerce activities, and online student services.

Enabling policies: aims to ensure that national VET policies and protocols support the use and expansion of flexible learning opportunities. The goal focuses on the construction of consistent policy frameworks across States and Territories, and developing data collection and performance measurement systems which support and reflect flexible learning activities (EVAG 2000b).

Problem-solving regulation: aims to improve the Australian legal and regulatory framework to further support the use of new technologies in the VET sector. In partnership with other education and training sectors, the goal will focus on providing consumer protection for learners, exporting Australian VET products and services, and removing any legal and regulatory barriers which restrict the use and expansion of information technology in VET (EVAG 2000b).

The five goals outlined in the *Collaborative Framework* provide a strategic platform for the expansion of new learning technologies in the Australian VET sector. However, the success of this expansionary policy is dependent on the implementation of a range of supporting projects, managed largely at the State and Territory level. The projects span all five goal areas, and cover a range of strategic policy and operational issues. There are 26 projects in total, all of which are outlined in *Strategy 2000*, the implementation plan which supports the *Framework* in 2000. In all, up to $20 million in funding is available each year to support the five-year *Framework*.

To maintain the fluidity and responsiveness of the five-year plan, a new Strategy will be developed for each year of the *Framework*. Individual projects will be retained, recast or omitted within each goal area in an annual evaluation process. This continuous evaluation process ensures that the *Framework* remains responsive to the needs of VET clientele, as well as developments in the global VET training market.

An important instrument in the management and communication of the *Collaborative Framework* is the project web site, at flexiblelearning.net.au. This site is the gateway to all *Collaborative Framework* projects and activities, and is due to go online in July 2000.

CRITICAL SUCCESS FACTORS FOR THE COLLABORATIVE FRAMEWORK

The abiding issue for policy makers is the identification of the critical factors that will ensure the continued success of the *Collaborative Framework*. It is true that the competitive nature of the global education market makes competitive collaboration at a national level an urgent imperative of governments at both the Commonwealth and State and Territory level. Yet the extent of cooperation across governments, and their active participation in *Collaborative Framework* policy development and project management, points to other factors relevant to its success.

The *Collaborative Framework* contains seven principles that were designed to guide the direction and values of work undertaken as part of the five-year plan. These principles were agreed upon by the Commonwealth, States and Territories to guide national collaborative activities, and form a critical element in the success of the *Collaborative Framework* (EVAG 2000a:18):

- Shared benefit to all States and Territories
- Strategic use of new learning technologies
- Accelerated take-up of flexible learning methodologies
- Strategic partnerships between governments, VET agencies, and other organisations in the public and private sector
- Leveraged investment of national funds for maximum impact

- Employee involvement in flexible learning practices
- Driven by client demand

These principles operate at two levels. In the first instance, they provide strategic direction for the development and evaluation of policy and project initiatives. However, these principles also operate at a process level, guiding the way in which decisions are made, and providing a structure in which a strong working relationship between the Commonwealth, States and Territories can be maintained.

It is perhaps this issue of process that provides the key to understanding the distinctive nature of the *Collaborative Framework.* A central element in its success resides with the equality and independence of its constituent stakeholders. The policy body responsible for provision of advice on flexible learning issues in Australian VET, the EdNA VET Advisory Group (EVAG), developed the *Collaborative Framework* in consultation with each of its constituent members, drawn from the Commonwealth, the Australian National Training Authority and each State and Territory. Each constituent member has equal weight in policy negotiations. Within this context, the level of collaboration is indeed remarkable, but is a consequence of democratic discussion and shared visions for flexible learning, rather than compulsion. It is this fluidity in the development of policy frameworks that allows the *Collaborative Framework* to remain innovative and responsive, both to the needs of the constituent members, and the external education and technological environment.

The equality and independence of EVAG stakeholders occurs within a wider VET policy environment that is committed to the development of a national system of VET in Australia. This commitment is reflected in the 1992 agreement of the Commonwealth, States and Territories for the establishment of the Australian National Training Authority (ANTA). ANTA's primary policy responsibility is to oversee the development of a national system of VET that ensures that "the skills of the Australian labour force are sufficient to support internationally competitive commerce and industry and to provide individuals with opportunities to optimise their potential" (ANTA 1998; see also www.anta.gov.au). In this context, the *Framework* represents a continuation of broader Australian VET policy, which is mindful of the international developments in new technologies, and their impact on flexible learning in education.

MEASURES OF SUCCESS

Of course, an important component of the *Collaborative Framework* is its continuing commitment to evaluation. The five year plan includes six agreed national outcomes by which the VET sector can measure the success of the *Collaborative Framework* in facilitating the application of new technologies to VET products and services (EVAG 2000). The six outcomes are:

- A high level of learner and employer satisfaction with the quality, quantity and results of online training programs and services
- Increased participation in learning away from an institutional setting
- Increased participation in VET as a result of the use of online technologies, including those groups who have difficulties accessing traditional institution-based training
- Increased investment in flexible learning projects by ANTA, other public organisations, and private sector bodies
- Increased overseas online VET enrolments and revenue earned from those enrolments
- Accumulated case study examples of how the Collaborative Framework has accelerated the use of flexible delivery methods, and improved the quantity and quality of flexible learning in VET

The *Collaborative Framework*'s capacity to measure its performance in relation to these six outcomes is limited by current data collection methods. A more robust suite of measures to evaluate VET sector performance is currently under development, and should be available for use in 2001 (EVAG 2000a:19).

FLEXIBLE LEARNING IN 2004 AND BEYOND

The dynamic nature of new technologies will ensure that VET policy planning is a continuing process that extends well beyond the five-year horizon outlined in the *Collaborative Framework*. An important challenge for the Australian VET sector in this climate is to ensure that the policy and planning framework remains relevant to the external world. More than this, however, the *Collaborative Framework* must 'speak' to the clients of the Australian VET sector itself, for without their participation and support, new flexible learning initiatives in the sector will not be taken up. This, then, may be the greatest task of the Australian VET sector: to create a level of excitement and achievement in flexible learning at the local level, in a global market that waits for no-one.

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E-PORTFOLIO: MORE THAN AN ELECTRONIC RESUME

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Index: Portfolio, Electronic, Career, Interactive, Competencies

Abstract: Paper-source portfolios have become instrumental in measuring learning and promoting one's accomplishments. However, they lack an interactive component and are frequently cumbersome to carry and disseminate. On-line career portfolios overcome many of the difficulties of paper-source portfolios and provide additional benefits. This article discusses these benefits along with the caveats of on-line portfolios and responsibilities of the network administrator and students. Visit the e-portfolio website at www. ferrum.edu/ portfoli.

INTRODUCTION

Paper-source portfolios have become instrumental in measuring learning and promoting one's accomplishments. However, they lack an interactive component and are frequently cumbersome to carry and disseminate. On-line career portfolios or e-portfolios overcome many of the difficulties of paper-source portfolios and provide additional benefits, including flexibility, accessibility, and interactivity. Job candidates can demonstrate a plethora of skills and abilities in an organized, user-friendly electronic environment. At the same time without adequate resources allocated to the process of developing and maintaining an on-line portfolio, it can become a frustrating and unproductive endeavor. Not only does this article discuss concerns specific to e-portfolios, it also illustrates a recently implemented model of an on-line career portfolio.

BENEFITS

Before discussing the benefits of on-line portfolios, a traditional portfolio needs to be defined. "Port" means portable or to move, and "folio" means leaf or page. Typically, it consists of a hard copy in a ring notebook (usually 14" X 17") often with a zippered closing with a handle. Each piece of work is enclosed in a plastic sheet facing the same direction as other works, and eight to 20 pieces are included. In a few instances, this type of portfolio is still the optimal method for representing one's skills, abilities, and competencies. For example, artists need to exhibit their actual work, if possible. However, as previously stated, on-line portfolios overcome many of the difficulties of paper-source portfolios. In addition, an on-line portfolio remains closely tied to the etymology of portfolio. In general, portfolios provide the following benefits:

- ☐ Show achievements
- ☐ Document the quality of academic training and experience
- ☐ Exhibit professionalism in presentation and domain-specific content
- ☐ Demonstrate competencies in foundational and domain-specific areas
- ☐ Illustrate problem-solving and critical thinking abilities

- Market self to potential employers
- Display leadership abilities
- Exhibit interest in community

Although these can be powerful reasons to maintain a portfolio, the bottom line is that employers want to do know what you can do, and being able to demonstrate capabilities is becoming a vital component of the interview process. A portfolio embodies direct indicators of learning experiences. A career portfolio could include academic work (written papers, computer projects and audio/video bites), extracurricular activities (newspaper reporter, tutor, performing arts or sports participant), travel experiences (pictures or written accounts), and community service activities (newspaper articles, journal excerpts, or pictures).

For many seeking employment, an on-line portfolio is an inexpensive way to give their work added portability, to demonstrate critical thinking and problem-solving abilities in an interactive medium, and to provide a link to the potential employer without personal contact. For example, an Access program, developed to be user friendly with a nicely designed interface and nested IF functions for complex calculations, cannot be adequately represented with a typical paper portfolio. To be a useful recruiting tool, the employer needs to be able to navigate and manipulate the program to understand the abilities and competencies that were required to create it. E-portfolios provide the perfect venue for such explorations. By making the files read-only, the investigator can plug in his or her own values and observe the program add records, recalculate financial information, or produce a p-chart for quality control. Yet, these modifications will not be saved to the original file, and it remains intact.

Although students and graduates can have a variety of work on-line displaying an array of abilities and competencies, customization can be produced by indicating in a cover letter which entries are applicable for a particular job. The cover letter can also specify which pieces of work exhibit different abilities and competencies. However, this needs to be limited. Employers do not want to read a long laundry list. Nevertheless, having discussed the on-line career portfolio with employers, they indicate that they would definitely visit the website of an applicant that provided them with the Internet address.

CAVEATS

Although on-line career portfolios provide a clear advantage for students and graduates, potential threats to its usefulness must be addressed or they will consume the benefits. When I started this undertaking, I thought I would have the portfolio on-line in three months. Instead, it has taken a year. There were few references to provide assistance; so I learned as I discovered things that worked and, more frequently than not, things that did not work. Although this article is far from comprehensive, hopefully, it will provide a starting point and prevent users from repeating many of my mistakes.

One of the first tasks that needs attention is discussing the project, especially the resource requirements, with the network administrator. If he or she cannot provide the time, server space, backup of files, and daily updated virus protection, the project should not go forward. However, if these resources seem adequate, it is imperative that information be shared between the portfolio administrator and the network administrator. For example, if a server crashes because the disk is full and the files are moved to another server, the portfolio administrator should be notified immediately. Employers are not going to use an on-line service that is frequently off-line. Periodic meetings between the network administrator and the portfolio administrator might resolve many of these problems.

Another important issue is ensuring that the division chair or supervisor understands the resource requirements, especially that release time will be needed from divisional duties, such as teaching and committee work. Certainly one of the primary reasons the on-line career portfolio was delayed in my undertaking was because I was detained by teaching and committee duties. Release time and/or clerical support is essential if the on-line portfolio is to be updated and maintained in a manner that adequately represents the skills and competencies of the students and gradates. One way of focusing on these activities is to submit a budget for maintenance and audit functions. Keep a log of the time requirements of the on-line portfolio, and submit it with the annual budget.

The network administrator, department chair, and portfolio administrator should determine the level of security that will be imposed on the e-portfolio. Some schools maintaining electronic resumes require employers to obtain a password. However, this restricts its accessibility and may deter its use while increasing time requirements for its maintenance. At the very least, all the files posted on the portfolio should be read-only so that they remain intact even if manipulated by employers. Consent forms should be signed so that students and graduates understand that personal information may be widely disseminated and that their work runs the risk of being plagiarized. Recommend to them that personal information, such as home address, should be kept to a minimum.

The on-line career portfolio should be outcomes-oriented and exhibit work that represents one's ability to meet both general and specific job requirements. Its purpose is not to show improvement or display personal information not related to pursuing employment. It should demonstrate abilities, skills, and competencies sought after by employers, and maintain a high level of professionalism.

Establish an evaluation process and criteria to determine which pieces of work should be posted to the on-line career portfolio. This will vary depending on the student population the portfolio will represent. For college graduates, only work that has been corrected and is error-free should be considered for inclusion on the website. However, students with special needs may have their best work included even if it is only of average quality. Regardless of the quality issue, all posted work should demonstrate identified skills and competencies, especially critical thinking. Limit the number of works that represent similar proficiencies so as not to overwhelm employers as they attempt to determine what students/graduates can do. A few well-selected pieces can adequately depict one's foundational competencies and well as domain-specific knowledge. Above all else, remember that this portfolio represents the school to a wide audience.

The on-line career portfolio should be easy to navigate, allow employers to become quickly oriented to the information provided, and should not upstage the individual work of students. The format for introducing each work should be succinct, yet clearly describe each posting. The background should be black, the font style clear, and the text color bold against the dark background. Please refer to Figure 1 and Figure 2 for an example of the portfolio homepage and an individual website.

Students should be encouraged early in their schooling career to develop quality work for inclusion in the on-line career portfolio. When they graduate, their individual portfolio is complete. Too frequently, they scramble to locate their work as graduation approaches and expect the portfolio administrator to get it on-line yesterday. This creates a difficult situation. If possible, include a portfolio requirement in the syllabus and encourage your colleagues to do the same. Another way to limit this problem is to maintain contact with the students in order that exceptional pieces of work are posted in a timely manner.

The on-line career portfolio must be manageable, otherwise it will be a nightmare to administer. After deciding its purpose, do not stray from it. Do not link to other websites regardless of how useful they might be. Since URLs frequently change, links on the website must be frequently updated increasing the time needed for maintenance. Establish a time period for posting work after graduation. The longer the work is maintained, the more expansive the website becomes. Two years seems to be a reasonable period of time where graduates should be able to build a credible work history that should replace the need for the portfolio. Current contact information, i.e. e-mail address, is essential post-graduation and must be updated on the individual websites as needed.

In order for the on-line portfolio to be successful and meet its purpose, other stakeholders should be brought into the process early. These may not be the same for all institutions but could include career services, admissions, employers, parents, and public relations. These are in addition to the network administrator, department chair, and students. Consider developing an Advisory Board consisting of several of the stakeholders, especially employers for they know what skills and competencies are needed in the workplace and how best to showcase them.

Finally, the on-line career portfolio should have flexibility. Develop a system of managing folders and files that is readily identifiable, easy to link, and can handle a wide variety of file types. This requires some planning, but it is essential. Remember the portfolio will consist of literally hundreds, and perhaps thousands, of files and without proper organization will be unmanageable. In addition, employers should be able to manipulate, observe, print, and download the students' and graduates' files in order to examine them for content, skills, and competencies. At the same time, the files should remain intact and unchanged after the manipulations.

PORTFOLIO ADMINISTRATOR RESPONSIBILITIES

Many of the responsibilities of portfolio administrators were discussed previously. For this reason, this section is more or less a summary listing duties.

- Develop and maintain portfolio website
- Maintain contact with network administrator on such issues as security, disk space, and server changes
- Submit annual budget--including needed release time or clerical assistance
- Disseminate information to students, employers, and other stakeholders
- Allocate time for meetings with students, either as a group or individually
- Inform students of their responsibilities
- Obtain signed consent form
- Take possession of files--encourage students to e-mail the files rather than having numerous disks
- Evaluate quality and appropriateness of work
- Check files for viruses or other forms of corruption
- Make backup copies
- Make files read only
- Maintain contact with other professors concerning corrected work
- Modify individual websites as needed with additions and deletions
- Check modifications

- ☐ Maintain updated contact Information
- ☐ Delete graduates' work two years post graduation
- ☐ Make sure that website is online and URL functioning properly
- ☐ Hold periodic meetings with other stakeholders such as admissions personnel, career services, employers
- ☐ Seek feedback from students, employers, career services personnel, etc. on ways to maximize the use of on-line career portfolio

STUDENT RESPONSIBILITIES

Since the on-line career portfolio is for the purpose of advancing the career aspirations of students, their responsibilities should be clearly delineated and rules concerning them enforced. Each school needs to define what is appropriate for their student body and graduates. However, a limited list of responsibilities follows.

- ☐ Schedule appointment with portfolio administrator
- ☐ Determine competencies to be showcased
- ☐ Provide current resume
- ☐ Provide files of projects--preferably via e-mail
- ☐ Sign consent form
- ☐ Include only work that has been corrected and of high quality
- ☐ Keep portfolio current
- ☐ Provide current contact information
- ☐ Monitor website for accuracy
- ☐ Inform potential employers of website--include URL on resume and cover letter
- ☐ Maintain familiarity with each posted project

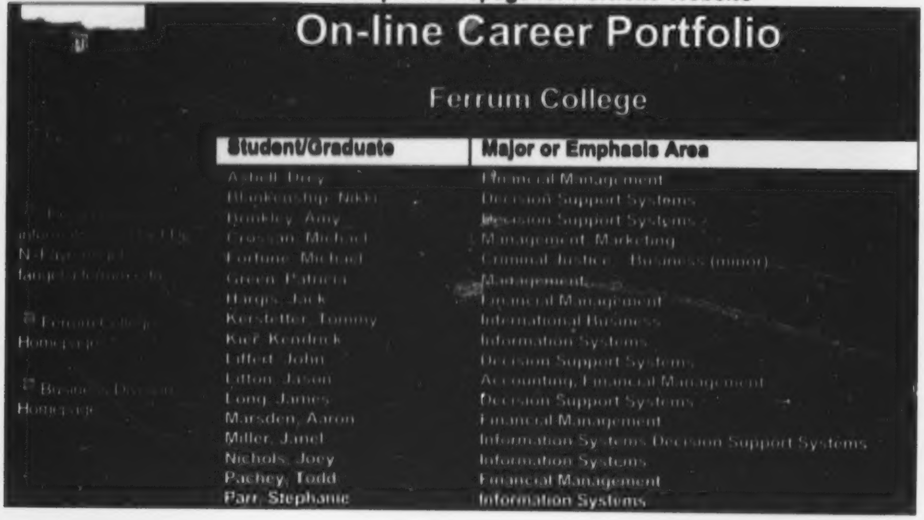
Although most of these responsibilities seem self-explanatory, maintaining familiarity with each work needs particular emphasis. Employers seriously considering hiring an applicant will download projects and papers, and study them. During the interview, the candidate should be prepared to answer very specific questions about any portfolio entry. The consequences of not being able to respond appropriately to such inquiries could be unfavorable for the applicant as well as the school.

CONCLUSION

The career e-portfolio is not where I had envisioned it a year ago. Without release time from teaching responsibilities and with significant demands from divisional and committee duties, I continue to struggle to maintain the portfolio with current information and projects. This is a labor-intensive task. Nevertheless, the on-line career portfolio is providing our graduates with an advantage over graduates from more high profile schools because employers can not only observe what they have created, they can interact with their programs and projects. If you have questions or comments, please e-mail them to me at fangel @ ferrum.edu. Please visit the on-line portfolio website at www.ferrrum.edu / portfolio/

Figure 1

Sample Homepage for Portfolio Website



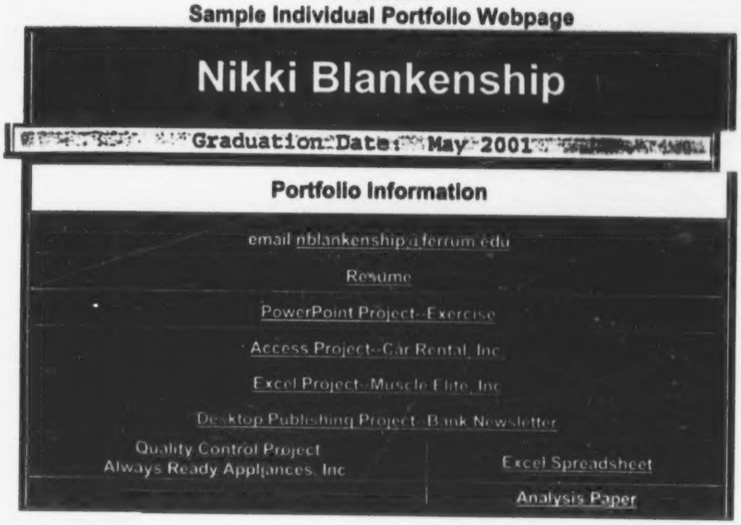
On-line Career Portfolio

Ferrum College

Student/Graduate	Major or Emphasis Area
Asbell, Drey	Financial Management
Blankenship, Nikki	Decision Support Systems
Brinkley, Amy	Decision Support Systems
Crossan, Michael	Management, Marketing
Fortune, Michael	Criminal Justice -- Business (minor)
Green, Patricia	Management
Hargis, Jack	Financial Management
Kerstetter, Tommy	International Business
Kier, Kendrick	Information Systems
Lifferd, John	Decision Support Systems
Litton, Jason	Accounting, Financial Management
Long, James	Decision Support Systems
Marsden, Aaron	Financial Management
Miller, Janet	Information Systems Decision Support Systems
Nichols, Joey	Information Systems
Pachey, Todd	Financial Management
Parr, Stephanie	Information Systems

FIGURE 2

Sample Individual Portfolio Webpage



Nikki Blankenship

Graduation Date: May 2001

Portfolio Information

email nblankenship@ferrum.edu

Resume

PowerPoint Project--Exercise

Access Project--Car Rental, Inc

Excel Project--Muscle Elite, Inc

Desktop Publishing Project--Bank Newsletter

Quality Control Project Always Ready Appliances, Inc	Excel Spreadsheet Analysis Paper

BEST COPY AVAILABLE

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A JOINT VENTURE IN DISTANCE EDUCATION PROGRAM BETWEEN HONG KONG AND AUSTRALIA

Fun-ting Chan and John Messing
The University of Hong Kong, Hong Kong and Charles Sturt University, Australia

Index: Distance education, information technology, education partnership

Abstract: This article examines how the use of information technology overcomes some of the difficulties in delivering vocational education at a distance. It then discusses how the collaboration of an overseas institution with a local academic partner can offer an enhanced distance education program. In addition to the reflections of the academic and administrative staff, feedback from the students is collected through a questionnaire survey. The students' general course satisfaction and their opinions to the enhanced form of distance education are investigated. The findings of this case study provide a useful reference for distance education providers to enhance their competitiveness when operating in other countries.

INTRODUCTION

In the information era, there is little limit for an institution to extend its delivery of education from its campus to other places and from its home country to other countries. Distance learning is seen as a solution to provide education and training at a lower cost and with higher flexibility. A common and important question about distance learning concerns its effectiveness when compared with conventional face-to-face teaching. There is no definitive answer to this difficult but important question. We are lacking a universally agreed definition of learning effectiveness as well as being influenced by many confounding factors such as the nature of the course and the cultural background of the learners.

This article does not attempt to answer the above question. Rather, it takes en empirical approach by examining a case study of how distance learning can be enhanced by appropriate combination with face-to-face teaching in a cost-effective manner. In Belanger and Jordan (2000), distance learning is not seen as an all-or-nothing experience. In reality, it is not necessary to assume distance learning must wholly substitute the conventional face-to-face teaching. In a *combined delivery*, part of a course can be delivered via the traditional classroom environment and the other part via distance learning. When an institution provides a distance learning course overseas using the combined delivery mode, it can collaborate with an academic partner at the receiving end so as to keep the cost of the face-to-face teaching component reasonably affordable.

Charles Sturt University (CSU), Australia offers a Graduate Diploma of Applied Science (Information Technology) in Hong Kong in collaboration with the School of Professional and Continuing Education (SPACE) of the University of Hong Kong using the combined delivery mode. In the following sections, we first describe how this course is offered in distance learning mode in Australia and how it is enhanced when transported into Hong Kong. We then discuss the benefits of using two teaching modes together in a course. We follow to report on the feedback of the students and their opinions towards the preferred learning mode. Lastly, we summarize the findings and arguments of the paper in the conclusion section.

THE JOINT VENTURE

Charles Sturt University was established in 1989 by the amalgamation of a number of institutions of higher education. It has a proud record of higher education in Australia spanning more than 100 years and a long tradition of offering education to international students. Distance education is a particular strength and focus at CSU and has opened up opportunities for study by distance learning, for the adult and part time students especially. There are over 28,000 students enrolled in over 150 courses with more than 2,500 different subjects.

The School of Professional and Continuing Education (SPACE) of the University of Hong Kong is the extension arm of the University. Its role is to provide access to career training and education opportunities for the community. In 1999, a course enrolment of over 80,000 was recorded. SPACE offers a number of award-bearing courses in collaboration with overseas universities. In some cases, these courses are in areas that have very strong demand, for example, information technology. In other cases, the courses are in specialized areas that are not formally available in local tertiary institutions, for example, library and information science (Mills and Chan, 1999).

In 1993, the two institutions jointly offered the CSU Graduate Diploma of Applied Science (Information Technology) in Hong Kong. Some people may doubt whether the quality of a distance learning course can be maintained when it is operated in another country with a different culture. The following features are believed to have ensured the academic quality of the course offered in Hong Kong and may even have enhanced the course quality.

DISTANCE LEARNING MATERIAL IS PORTABLE

The fact that distance education material can be physically transported to other places is partly a guarantee of academic quality even though the course is offered overseas. In Australia, students can only study the course in distance learning mode. They only go to the CSU campus for a three-day study school at the beginning of the course and these days, this has even been made optional. They continue their study off campus, based on the study packages supplied by CSU. Assignments are submitted and sent back mainly by mail.

When Hong Kong students take the CSU distance learning subjects, they receive the same study packages. CSU staff visit Hong Kong at least once a year to conduct orientation and the introductory study school. The Hong Kong students enjoy no less teaching support than their counterparts in Australia, despite the fact that they are overseas students. In practice however, the slightly longer mail delivery time for submission and returning of assignments can sometimes be a bit of concern.

TECHNOLOGY ENHANCEMENT

The advancement in technology, especially the telecommunication technology, helps to reduce the barrier of distance. One of the strengths of the Graduate Diploma in Applied Science when it was first introduced in Australia in 1985, was the insistence that all students have access to the necessary Information Communications Technology (ICT) to regularly connect to CSU. These days, students can easily communicate with CSU and the teaching faculty through the Internet, email and various other ICT tools such as discussion forums that have been provided. The electronic communication has obvious advantages over the conventional mail, the facsimile and the phone. In addition to the University homepage, an online subject homepage with a teaching forum is organized for each of the subjects. Teachers can place announcements, news, comments related to the subject as well as provide assessment feedback through the subject homepage. They can take part in discussions with the students and answer their questions in the teaching forum. Every student, no matter where they live, can access the information and participate in the discussion. Students now have an efficient channel to interact with their fellow students which was difficult, if not impossible, to have in the past. Within cyberspace, it does not make much difference whether students are in Hong Kong or in Australia.

FACE-TO-FACE MEETINGS

In Hong Kong, the program is operated in an enhanced mode. Two of the subjects are taught entirely by face-to-face teaching. We believe that for certain skills and practically oriented subjects, face-to-face lectures and workshops are often more efficient than distance learning. For the other distance learning subjects, students receive face-to-face tutorial support of around 16 hours per subject. When students can read announcements posted by the CSU academic staff, communicate with them using email, and participate in the teaching forum discussions, why do we still organize tutorial meetings?

Of course, there are many constraints and overheads in attending face-to-face meetings, such as scheduling the time and travelling to the meeting place. Distance learning is supposed to eliminate these problems. There is also some doubt whether these meetings are cost effective and whether such arrangements deter independent learning that is required in distance education. The same can be said of many face-to-face teaching strategies.

In Hong Kong, the overhead in travelling for attending meetings is far less a concern than in Australia. There is however, the added problem of learning content written in English when this is not the native language of the learner. We believe that local tutors are able to elaborate on the distance learning study materials and make it easier for the students to interpret the knowledge and apply it to their actual working environment within their local context. Wherever appropriate and necessary, study materials can be enhanced and supplemented with lectures such as the handling of information in Chinese.

The tutorial meetings also provide an opportunity for the students to have peer discussion on their learning outcomes and difficulties. The sharing of working and study experiences among themselves is also a valuable part of the learning process. The psychological and mutual support generated by the peer group cannot be neglected. Hong Kong is rather famous in its fast pace and busy working environment. It is quite easy for the students to fall behind the study schedule if they are studying alone. It does not mean that they are not capable of studying independently, but it is very difficult for them to maintain a regular study schedule when faced with all sorts of pressures for time. The scheduled tutorial meetings provide students with an effective mechanism to set checkpoints and to regulate the study plan.

We have sought the views of the students by conducting a questionnaire survey in March 2000. A majority of the students responded that they preferred the combined distance learning and face-to-face delivery mode over the purely distance learning or the purely face-to-face teaching mode. The result indicates that a compromise between the two pure forms of teaching modes gives students the benefits of both worlds. This point is elaborated upon below.

OTHER ACADEMIC SUPPORT

Through SPACE, students have access to the libraries and computer facilities of the University of

Hong Kong. SPACE has well equipped classrooms and computer laboratories in a number of conveniently located learning centres. When the students have study or personal problems, it is easier for them to get assistance from the local tutors and administrators that they are more familiar with. This provides convenient access to solve many of the simple problems, quickly and efficiently.

TEACHING MODES

Distance education is increasingly being seen as a more economic education delivery proposition. But market acceptance and resistance is yet to be tested and may not necessarily be the same over all subjects and in all courses. Cultural factors must also play an important part (Robinson 1998). The Asian students are perceived to be reluctant to become active learners. Can the increasing use of technology in course delivery, in communication between teacher and student, alter the traditional role of the teacher and student in Asia?

In countries like Australia, given the choice between attending face-to-face classes and studying at home, many students choose the latter. Can this experience be transferred into the Asian context? From the following comment by Cheng (1998), regarding students in Asian culture, it is uncertain whether Hong Kong students prefer to study at home and communicate electronically with their teachers.

> Students in Asian culture are also not used to expressing themselves and exchanging views. They are more used to listening, keeping analyses in their minds, and express themselves only when it is very necessary. As such it remains to be seen whether the extension of the physical classroom to the cyberspace would further discourage or encourage interaction among students. (p. 8)

In our questionnaire survey carried out in March 2000 with the graduate diploma students, we asked them to select which teaching mode they preferred most. Two thirds out of the twenty one respondents prefer the existing arrangement, that is, some face-to-face taught subjects and some distance learning subjects with supporting tutorials. For the other respondents, five (24%) preferred all the subjects to be this hybrid of distance learning with tutorials. Two (9%) preferred face-to-face teaching for all the subjects. No one preferred the pure distance learning mode. This finding is encouraging support of our belief that the combined delivery provides Hong Kong students with the benefits of both worlds.

The distance learning has certain economies and conveniences. It also comes from an overseas university that delivers academic quality. By teaching a small number of subjects in face-to-face mode and providing tutorials in others, gives students personal contact with the teachers and fellow students. The academic and psychological support is valuable to their learning process. Perhaps we should not move too quickly towards a situation of less personalized teaching or total reliance on electronic access where the teachers and students increasingly become remote and impersonal, unknown to each other.

STUDENT BENEFITS

It could not be a complete success if the joint venture does not benefit the students. There is no doubt that the students are attending a course they need, otherwise they simply would not enroll. While they study for an Australian degree accredited by the relevant professional body without leaving Hong

Kong, they have enhanced, instead of restricted, support when compared with the fellow students in Australia. The overall tuition fee and the related expenses for studying in Hong Kong is much less than studying aboard in Australia as there is no boarding and travelling expenses. Since students can continue with their existing employment, the saving in opportunity cost is quite significant. Through the collaboration of the overseas and local institutions, the tuition fee for the enhanced combined delivery is comparable to the fee of pure distance learning.

But do the students find the course of high quality? Do they have problems in taking a distance education course offered by an overseas University? From the questionnaire survey. it was found that the students are satisfied with the distance education study packages, the assessment, the tutorial support, and the face-to-face teaching. In the written comment section of the questionnaire, the most mentioned issue was a simple logistical one, the need to organize the meeting venue at a conveniently accessible place. Some mentioned that even for the face-to-face subjects, a detailed study guide such as in the distance materials should also be provided. The fact that the distance learning subjects are offered by CSU at a distance does not appear to be a problem at all.

CONCLUSION

We have seen the delivery of a distance education course from an Australian university in Hong Kong in collaboration with a continuing education unit of a local university. The trend towards globalization happens in education as in other business areas. The computing and telecommunication technologies narrow the gap between the distance education provider and students, making distance education more effective. Nevertheless, some personalized contact between the teachers and students and among the students is still valuable and should be maintained. This is especially appropriate for places like Hong Kong, taking into consideration its geographic convenience and the cultural background of the students.

The overseas and local partners complement each other and provide an enhanced, combined delivery course in a cost-effective manner. Students enjoy the benefits of both distance education and face-to-face teaching. They do not need to go abroad but are able study for an Australian University award. At the same time, they received valuable teaching and tutorial support.

This example reflects the dynamic, flexible, and cost effective nature of developing continuing and professional education. The findings of this case study provide a useful reference for distance education providers to enhance their competitiveness when proposing to operate in other countries. On the other hand, it also reveals how a place can meet education and training needs through cooperation with overseas institutions. The key factor to its success is through international collaboration. The synergistic effect of the collaboration creates a win-win situation for the two institutions and the students. It is believed that the quality and effectiveness of distance education can be improved. The students, of course, become the primary beneficiaries.

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AN EVALUATION OF A MODEL MULTIPLE SITE DISTANCE LEARNING PROGRAM FOR NON-TRADITIONAL STUDENTS

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Betsy Orr
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Cecelia Thompson
The University of Arkansas, Fayetteville, AR

Index: Human Resource Development, Distance Learning

Abstract: The purpose of the evaluation was to determine student's perception of the effectiveness of a multiple site distance education program. Part 1 evaluated the distance education process. Students reported a positive experience with distance education. Many were apprehensive at first but after a class or 2, most began to like the process and preferred it to traditional classes. Part 2 evaluated program incentives & barriers, class structure and application of course content. Students responded that evening and weekend scheduling was the greatest incentive to participation in the program while lack of access to the advisor/instructor was the greatest barrier.

INTRODUCTION

Many working adults without a baccalaureate degree are denied access to responsible workplace positions and frequently have limited opportunities for career advancement. These limitations are especially significant for adults working in remote or rural areas. These workers face issues such as lack of availability of higher education, many family obligations, and constraints of time and finances. These keep them trapped in their current occupational situation.

To provide opportunities for working adults, a degree program was developed in the department of vocational and adult education at the University of Arkansas. Graduates earn a Bachelor's of Science in Education in vocational education with a Human Resource Development (HRD) concentration. It is available only to adults who are working full time, have worked at least 5 years and have 40 to 60 college credits which are transferable to the University of Arkansas.

The program has 125 credit hours of class requirement. Fifty-six credits are general studies such as English, science, social studies, fine arts/humanities, math, health/ wellness, and media/computers. Thirty-three credits of technical requirements include coursework in a specialty area. Students have a choice of transferring business or HRD coursework, testing out of requirement through the National Occupational Competency Testing Institute (NOCTI) and receiving credit for work experience or industry training through the development of a portfolio based on guidelines developed by the Council for Adult and Experiential Learning, the American Council on Education and the National Program on Non-Collegiate Sponsored Instruction.

Thirty-six credits of HRD coursework are required in the degree program. The following courses are required as part of the 2-year cohort plan.

- Skills and strategies in HRD
- Theory and principles in needs assessment/evaluation

- Communications in HRD
- Strategic design of HRD
- Theory and principles in adult education
- Theory and principles in team building
- Strategies in professional development
- Leadership in HRD.

A 12 credit work-based project/internship is also required. The internship is a work related project built around the HRD coursework.

The degree program, which began in the fall of 1996, was structured as a partnership between the University of Arkansas and community colleges throughout the state. The students completed their general studies and many of their technical requirements at the local community college. After students finished most of their general studies, they began the University of Arkansas cohort component of the program by interactive audio/video. The human resource content courses were offered in an accelerated format meeting 9 weeks rather that the standard 15 weeks and meeting on weekends to accommodate working adults. Each course was offered at 1 host site and 3 or 4 remote sites. There were a total of 10 sites throughout the state of Arkansas with a current enrollment of 175 students. The students enrolled in this program were non-traditional students ranging in age from 25 years to 60 years.

PURPOSE

The purpose of this study was to determine student's perceptions of the effectiveness of a multiple site distance education program, which leads students to a Bachelor of Science degree with an emphasis in human resource development. Part 1 evaluated the distance education (interactive audio/video) process. It consisted of equipment use, interaction between sites, and instruction by distance education vs. regular classroom. Part 2 evaluated program barriers, incentives, and class scheduling.

Methodology

Ninety students participated in this study over a 2-year period. Data for Part 1 was collected with 6 open-ended questions. Each question asked for general feelings/attitudes about an aspect of the process. Thirty-five students who had completed 4 distance education courses responded to the questionnaire. Data for Part 2 was collected from 55 students randomly assigned to ten focus groups. All ten groups addressed 9 open-ended questions. Participants in this part of the study had completed 2 distance education courses.

Data Analysis

Content analysis was used to analyze the responses. Content analysis is an objective and systematic technique to describe the content of any form of communications. In education, content analysis is aimed at producing descriptive information by answering questions directly related to the material analyzed and identifying educational problems (Borg & Gall, 1989). Entries were analyzed by documenting key words and phrases in the text. Two researchers read the entries independently and then compared results.

Frequencies of responses to each item were compiled.

FINDINGS

Part One

Item 1 asked participants to comment on their perceptions of the use of the equipment in distance education. Results in rank order from high to low were rough beginning but then things worked well; equipment worked well, liked the use of technology; would like to see more use of video and other equipment; and the instructor was good with the equipment.

Item 2 asked learners to comment on their perceptions of the interaction with other students at other sites. Comments ranked from high to low were good to excellent interaction; were skeptical, but after a couple of classes warmed up to the type of class; liked group meeting in which all site students could meet each other; had a problem with class at beginning but became more comfortable with other sites as time went on, and instructor did well in including all students from each site.

Item 3 asked for perceptions of the effectiveness of instruction with the use of distance education verses regular classroom instruction. Results from highest to lowest were liked distance education classes better that traditional classes even if there were a few technical problems from time to time; distance classes were not much different from traditional classes; the instructor was the main factor in the success of the distance learning class; and technical problems made communicating more difficult and the use of the equipment made lecture difficult to follow.

Item 4 asked for learner suggestions for changes for distance education classes. Comments ranked from highest to lowest were most responded there was no need to change anything; would like more group time and less use of overhead transparencies; less lecturing; updated equipment such as better microphones; and more breaks.

Item 5 asked for learner perceptions of class components to leave the same. From highest to lowest comments were like to keep the instructors the same (not switch to new instructors for the next class); learning environment; class schedule; interaction between students from site to site; discussions; and demonstrations.

Item 6 asked for general comments regarding the use of distance education. The most common comment was that they liked the may the instructor related to them and included them in the class participation. Other comments included were liked the schedule (9 weeks of class rather that the standard 15 week semester) and were grateful to earn a degree without a commute to the home campus.

DISCUSSION

Part One

Overall students reported a positive experience with their distance education program. Many of the students encountered difficulties in the beginning of the class with use of the equipment. Some students reported difficulty interacting with students at other sites but became more comfortable as the course progressed. Students preferred the distance-learning mode of instruction when compared to instruction by traditional learning.

FINDINGS

Part Two

Data for Part 2 were analyzed by recording the written comments from the open-ended questions. The first question was "What incentives were there for you to enter the program?" The majority of the responses (66%) indicated that scheduling was the major reason for participation in the program. This included comments such as time of day and day of week courses were offered; location of classes, convenience of classes, and flexibility of program. This was followed by 13% who indicated that they received tuition reimbursement from their employers. Next, 10 % of the responses indicated that the reason for being in the program was for personal growth and the chance for pay raises or increasing their marketability. Also 10% of the respondents liked the program component that allowed them to earn college credit for work experience.

Question 2 "What barriers did you experience with the program?" revealed the following responses: First was lack of contact or accessibility of on-campus advisors/instructors (57%). Included in this category were items such as lack of understanding of overall program, transfer credit problems, lack of understanding of assignments, inability to receive class feedback and lack of updated advising information. The second item identified as a barrier was cost of the program (24%). The last was 19% were miscellaneous comments such as travel, time, lack of access to computers and student disruption in class.

Question 3 was "To what extent did the topic of Human Resource Development affect your decision to enter the program?" Sixty percent indicated a strong interest in Human Resource Development while 40% were just in the program to get a degree.

Question 4 was "How did the Friday/Saturday scheduling affect your decision to enter the program?" Ninety percent indicated that the scheduling was positive. Comments were made such as: "this is the major reason I am in the program" and "the scheduling is very convenient." Ten percent indicated that the scheduling made no difference in their decision to participate in the program.

Question 5 was " How did the number of class meetings affect your decision to enter the program?" One hundred percent of the responses were positive. Comments included "wonderful," "great" and "very convenient."

Question 6 was "How have you benefited professionally from this program?" Sixty nine percent of the responses were positive with comments like "knowledge learned has been applied" and "we have formed networks." Thirty one percent of the responses indicated that they had no opportunity to apply new knowledge learned in the classes.

Question 7 was "What factor of distance education has been the most positive experience for you?" Fifty six percent of the responses indicated that class interaction was the best part of distance education. The most frequent comment was learning from others in class. Forty four percent indicated that the location of the class in their area of the state was the best part of the program. Comments were "less travel time," "chance of earning a degree from the university without coming to class on the home campus" and "good schedule time."

Question 8 was " What factor of distance education has been the most negative experience for you?" Forty six percent indicated that the use of the distance education equipment was the most negative part of the program. Comments included "needed updated equipment," "delay of transmission on equipment effected class" and "there was a need for training on the use of the equipment." Thirty six percent indicated that the lack of an instructor on site was the most negative part of the program. Eighteen percent said that the class was too large for good class participation due to the number of distance education sites.

Question 9 was "What do you perceive as the major significant difference between regular classes and distance education classes?" Sixty six percent indicated that the major difference was they were treated like adults in distance education classes. Seventeen percent indicated that access to class instructor was a different. Also, 17 percent said that the convenience of scheduling was different.

DISCUSSION

Part Two

Students reported that they entered the program because of location, weekend class schedule, accelerated course of study, and professional benefits (salary enhancement, networking, job advancement). Less travel time and group participation provided positive experiences for the students. The greatest barriers reported were accessibility of on-campus advisors/instructors, inaccessibility to computers and financial constraints. Some students reported problems with the delay in compressed video time and lack of an instructor at the remote site.

CONCLUSIONS

Since the program was implemented, approximately 40 students have entered each year. Ninety-five percent of the students completed the HRD cohort courses by distance education. The high retention rate indicates satisfaction with the program. Approximately 30 percent of the students have completed all graduation requirements. Overall, students reported the distance learning experience as being more relaxed than traditional classes.

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HOW TO TEACH STUDENTS IN THE INFORMATION ERA?

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Hong Kong Institute of Vocational Education (Tsing Yi), Hong Kong

Index: Problem-based Learning. Student-centered teaching

Abstract: Problem-based learning (PBL) is a way to help students to think and make use of suitable information to solve their problem. However, direct import of the typical PBL model may not be appropriate to local student. This study focuses on the advantages and disadvantages of previous PBL model used and studying the effect of modified PBL model in a Higher Diploma engineering course in the HKIVE(TY). This modified PBL model uses a variety of teaching and learning modes to facilitate students to solve the real world cases. Promising results gathered from summative test and student interview show that this local context PBL model is suitable to all students.

INTRODUCTION

In the past, people were badly lack of information to support their learning and working. Nowadays, we experience too much information through different media especially through Internet. Usually, we can obtain a lot of related materials through search engineer from Internet. Then, another problems will be arised when we are facing such huge amount of information. How can we select suitable information to read in so limited amount of time? How can we digest the information? How can we make use of the information to solve our problem?

On the other hand, Students in Hong Kong are familiar and comfortable with didactic teacher-centered approaches. Some methods should be used to channel tertiary students out of the didactic teaching/learning model commonly found in secondary schools. One of the most effective ways for preparing independent life-long learners is when it is problem-based (Boud, 1985). Problem-based learning is one of the methods to improve the quality of student learning (Gibbs, 1992). PBL was found to maximize learning outcomes (Lai & Chu, 1997). There have been many studies of the effectiveness of PBL in increasing knowledge retention and fostering deep learning (Schmidt, 1989; Tans, 1986; Boshuizen, 1990). PBL is also known to enhance abilities of students to integrate basic science knowledge into the solutions of clinical problems (Patel, 1991). With regard to effective outcomes, PBL enhances intrinsic interest in subject matter. Barrows and Tamblyn (1980) advocates that this student-centered approach increases motivation because students are given chances to generate learning issues and thus have ownership to their own learning.

The philosophy of problem-based learning (PBL) is that deep understanding and learning can come only from active processing of new information. Problem-based learning, perfectly in keeping with contemporary constructivist views of education, is an instructional method that uses real world cases or problems as vehicles for students to acquire critical thinking and problem-solving skills (Lai & Chu, 1997; Chu & Lai, 1997). Original form of Problem-based learning (PBL) was created in Western countries and first used to teach medical students to find possible solution through real life cases. PBL is one of the student-centered teaching approaches that are proved to be effective to foster deep learning and improving problem solving skill. Traditionally, PBL works well in small classes and this method emphasizes on the learning process in which students actively engage in collecting information and solving a problem. Students are not working alone as they can build their own understanding under the guidance of instructor, but the instructor does not do the building for them.

There is growing number of research on the implementation of PBL in Hong Kong for different disciplines such as education (Biggs & Tang, 1997), engineering (Lai & Chu, 1997), and hotel & management (Tse, 1997). Although PBL is used by teachers in many different teaching and learning contexts, successful implementation of PBL may not involve direct transportation of the original form of PBL. Almost all local PBL models (Biggs & Tang, 1997; Lai & Chu, 1997; Tse, 1997) used were specifically designed to suit the individual teaching or learning context. Tang et al, in their study of PBL within the Hong Kong Polytechnic University, pointed out that consideration should be given to the actual teaching and learning context (Tang et al, 1997). There is a growing need to develop a context-based model which would preserve the philosophy and retain the key elements of PBL but allowed for modification and adaptation in response to each local teaching and learning context.

ORIGINAL FORM OF PBL

Original form of PBL was introduced in the then Hong Kong Technical College (Tsing Yi) two years before (Lai & Chu, 1997). The students discussed the case or problem as a group, clarifying terms and concepts not readily understood by making use of knowledge of the group members. Based upon their common consensus, the group then proceeds to generate hypotheses necessary to analyze the problem. Then they begin to define 'learning issues', which are more or less what they do not know and need to find out in order to solve the case. These learning issues serve as guide for studying the literature or searching for other sources. Learning resources are considered, and here the instructor and students decide on where they can find the relevant information. At the next session, students inform each other about their findings, and teach the rest of the class what they have learned about their assigned issue. Attempts are made to integrate the new information, and to relate it to previous knowledge. If the learning process raises new questions or leaves some issues still poorly understood, these too are listed and the cycle is repeated until a satisfactory evaluation and clarification of the case can be made. This second meeting aims at checking whether a deeper understanding of the problem has been reached..In all these processes the instructor attempts not to inform but to guide, support and encourage the students' initiatives.

The two Engineering classes used in this previous study was taught by the same teacher, with the Experimental (PBL) class (N=41) taught in the problem-based way, and the Control class (N=21) taught in the usual expository way. The final summative test consisted of questions testing the higher-order cognitive abilities. Results (Fig. 1) show that experimental students with a bias towards a deep approach to learning achieving considerably better than the deep-biased students in the control class ($t=2.20$, $p<0.05$). However, for surface biased students, the average test scores of both experimental and control classes are quite similar.

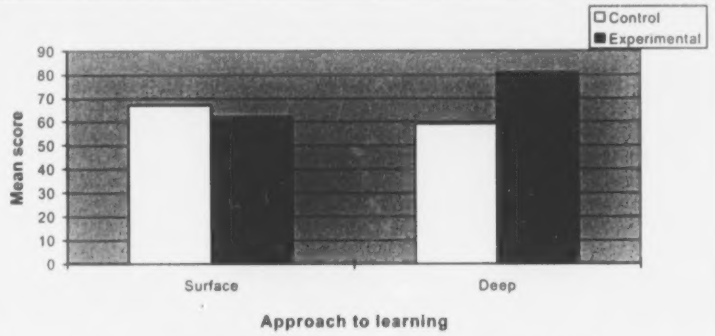

Fig. 1 Summative test means by treatment and approach to learning

The interviews clarified how this worked. Deep and surface students perceived the impact of problem-based learning teaching strategy for different assessment tasks in quite different ways. Deep learners of the liked problem-based learning for it can enhance understanding of the subject matter by individual and group work, hence, enable them to answer question easily. Quite a different response emerged from the surface learners when they had gone through the assessment tasks. The surface learners expressed their preference to low-order skill questions. Deep and surface learners also differed in the ways they studied for the test in this study. Most deep learners spent only a short period of time to prepare the test because they found they had already understood the materials after undergoing the problem-based learning process. Surface learners, on the other hand, had to spend more time to study before the test. They found a lot more difficult than the deep learners to prepare the test because they, without any lecture notes to study, could not understand the materials.

MODIFIED FORM OF PBL

The subjects are year one engineering students studying in the Hong Kong Institution of Vocational Education (Tsing Yi). A subject is randomly chosen for two engineering classes. These two large classes, with 74 students each, have the same entry qualification. The modified PBL model is designed to suit the course requirements and standards set by external engineering professional bodies. The modified PBL model uses a variety of teaching and learning modes which include lectures, tutorials, group discussion, and presentation to facilitate students to solve a main problem. For the experimental class, 4 students form a group. Members of each group are the same throughout this period of study (approximately 15 weeks) and all activities are group based. Students can tutor each other and solve problems collaboratively in the lecture as well as the tutorial.

A summative test is given to both experimental and control classes at the end of this study. The questions of this summative test are related to basic knowledge given in the mass lecture as well as the project work. Based on the numerical result of this test, learning outcomes between these two classes in this PBL program can be studied. This final summative test also consists of questions assessing the higher-order cognitive abilities. At the end of the study, eight students from the experimental group are randomly selected and interviewed. The aim of this interview is to probe in an open-end way how this modified PBL model may affect their learning and their views towards this new teaching approach. The interview is conducted in Cantonese and is audiotaped. Results (Fig. 2) show that the experimental class was superior to the control class in the test score, students with both deep and surface biased approach to learning achieving considerably better than the control class.

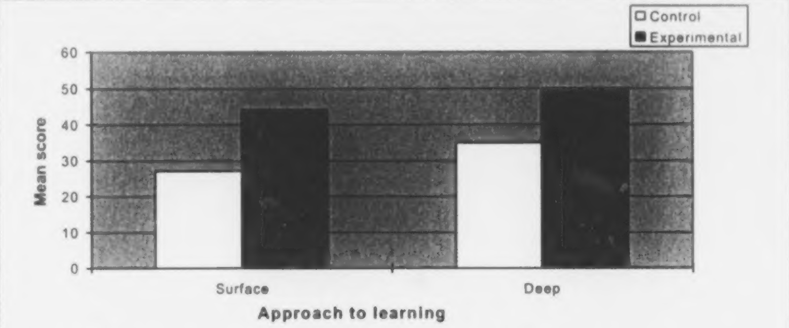

Fig. 2 Summative test means by modified treatment and approach to learning

It shows much difference for questions assessing students' higher-order cognitive abilities. The t-test for the average scores yields $t=2.837$ (surface) and $t=2.577$ (deep). In both cases, $p<0.05$, establishing a statistically significant of improvement of students' problem-solving skill in the experimental classes.

Positive feedback also obtained from student interview. Most students from experimental classes enjoyed the chance to discuss together during the completion process of the main problem. Actually, students could teach each other and remember the discussion process for a longer period of time. They were encouraged to work harder by peer pressure within a group. After the discussion in this exercise, students could be trained to think and learn independently. Even a surface student, who was not so active in the discussion, could learn difficult concept through the discussion process.

Supporting sessions such as lecture and tutorial were also essential to the success of this modified PBL model. These two teaching activities provided an environment for students to learn basic concept rather than start everything from zero by students' own effort. Problems given in the lecture and tutorial helped student think actively and understand the topic more so that they could eventually apply the theory to practical design with this PBL model.

Positive changes in learning style were found among students in the experimental class. Deep students had reported better time management and deeper thinking. Surface students had confidence to ask more questions and learned to transfer knowledge into practice.

CONCLUSION

As suggested by Tang et al, (1997), a direct importation of the typical model of problem-based learning is inappropriate. This can be reflected from the student interview that some students cannot solve problems by their own in the beginning. They would like to have some guidance of project work to lead them to acquire problem-solving skills. The quantitative results support the previous findings (Lai & Chu, 1997; Glasgow, 1997; Hadgraft, 1998) that problem based learning increases the problem solving skill of the students in the class. Positive changes were reported by deep students in the interview. In contrast with Lai & Chu (1997), the present study also shows an increase in the problem solving skills of surface bias students who are usually labeled as role learners and adopt passive learning approach (Griffith, 1992).

This hybrid PBL model provides an environment for students to actively solve real life case problems through the support of interactive lecture, quiz, and tutorial to learn basic concept and problem solving skills. Though the discussion process, students had different viewpoint to be expressed. Students can learn from different ideas generated to solve the same problem. This also creates more interest for students in learning. Both deep and surface students are encouraged to think and benefit from this active learning process.

This study concentrates on the full time engineering student. It is also worthwhile to study on the application of this hybrid PBL model to part time students or students of other non-engineering courses to find out any constraint that will be encountered. Finally, in order to improve cooperation between students within a group, it is better to introduce more elements such as cooperative learning into the process so as to help students better throughout the problem solving process.

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INTEGRATING ADULT LEARNING PRINCIPLES IN WEB BASED OPEN LEARNING

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Index: Open & Flexible learning, Adult learning, Web Based Instruction, Life Long Learning,

Abstract: It is evident that one of the driving forces towards a learning society resides in the role and power of information and communication technology. While the power and potential of technology is clear, the challenges lie in using technology wisely to advance the lifelong skills. The educational arena of web based learning is still in its infancy. While there are many institutions that are offering web based courses for adult learners, an in-depth understanding of the pedagogical issues related to integrating adult learning in web still remains an unexplored frontier. While literature provides some evidence of the effectiveness of using web based open learning, little is known about which learning strategies should be used to integrate adult learning principle in web to make it useful, interesting and exciting.

INTRODUCTION

A number of underlying social, economic, and technological forces are coming together to escalate the demand for lifelong learning and training. The present era demands retraining of workers at least five times in their working life. Changes in technology demands new ways of working, new business processes and new ways of delivering education. One of the options to meet the demand for life long learning while providing a range of open & flexible choices is online education. During the past few years, the world witnessed a phenomenal growth in communication technology, computer network and information technology. With the development of new broadband communication services, convergence of telecommunication with computers, recent developments in the field of communication protocol (Internet & WWW) have fostered numerous proposals for the uses of these tools for open & flexible learning (OFL). The technology evolution from distributed to interactive, and then to collaborative has offered unprecedented opportunities to implement enhanced form of open and flexible learning (OFL), anytime & anywhere in collaborative environment. OFL has played a significant role in the transformation of universities to places of lifelong learning. Information technologies are playing a key role in this expansion. However, the use of information technology does not necessarily equate with open & flexible learning, and it is a common misconception to confuse technology as being the end product rather than means of delivery.

Developing a web based open learning material requires more than an understanding of hard technology i.e. bit & bytes, electronics & satellites, CGI, search engine or HTML. What we need to understand is the soft aspect of the technology that provides a conceptual framework to develop courses in web for life long learning. Designing effective web based training requires knowledge of the unique characteristics of adult learners and understanding of the facilitator's role. It is easy to lose sight of the importance of the principles of adult education when caught up in the necessary tools and technology inherent in web. Present paper discusses the different dimensions of adult learning and highlights the importance of integrating adult learning principle in web based open learning to make it relevant, useful and exciting.

OPEN LEARNING AND WEB

Open learning is the term internationally accepted to apply to learning where learners have some choices as to what and when and where and how the learning takes place. Open learning is not a specific mode or way of delivering education, it is a philosophy about how education can be delivered in an open way. It is primarily a goal or an educational policy. The provision of learning in a flexible manner, built around the geographical, social and time constraints of individual learners, rather than those an educational institution. Bates (1995). Open learning philosophy focuses upon two major ideals:

> **The access ideals:** Where access refers to the reduction or elimination of any thing that stands between the prospective learners and the learning environment, it may be time, place or others
>
> **The learner centered ideal:** Where learner centered ideal refers to the provision of learning opportunities to the individual learners by providing control over the pace and style of their learning. It enables learners to have greater independence and control over the learning process.

Open learning approaches in education and training offer increased opportunities for people to learn over lifetime. One way of explaining the philosophy of open learning is the extent to which flexibility of options and choices (content, place, time, and pace of study) are provided for the learner. With the convergence of computer and communications technology through the World Wide Web, we now have the capacity to offer enhanced forms of flexibility. The capacity of the web to hyperlink and layer information, provide interactivity and support multimedia formats makes it a valuable and exciting tool which can used to develop, deliver and manage flexible learning programs at any time and anywhere. At its simplest the Web can be used to co-ordinate and manage learning and act as a point of communication for staff and students. At its most sophisticated it can be an online or offline virtual learning environment that facilitates the entire educational process. Information technology has made it possible to implement OFL program at its fullest extent. However, the use of information technology does not necessarily equate with open & flexible learning, and it is a common misconception to confuse technology as being the end product rather than means of delivery. Designing effective web based OFL materials for life long learners requires to know about adult learners particularly their characteristics, context and needs. This will help to shape the materials in complexity, amount, details, breadth and relationship.

ADULT LEARNERS ARE VARIED

The term adult learners represent a wide spectrum of mature learners. This includes but not limited to single mothers, middle aged man seeking a change in career, women returning to the workforce after having spent years caring for their children and families, persons who did not have the opportunity to attend college between the ages of 18 to 22 due to financial limitations, but also worker at large need training for change in technology. In as much as each of these learners has different circumstances associated with becoming an adult learner, they do share a common set of needs and expectations from the educational experience and environment. It is now becoming imperative to understand the unique characteristics of adult learners to design effective and appropriate web based on-line courses.

ADULT LEARNERS ARE UNIQUE

Adult learners are people who come to us with their unique backgrounds, personal experiences, conceptual understanding and approaches to learning under personal circumstances. Authors such as Knowles (1998), Brookfield (1990), has described the special characteristics of adult learners. Adult learners bring a wealth of real-life experience to training that can be a resource for learning and they are motivated to learn as a response to problems in their lives. They prefer to learn at their own pace, own time, and own place and often around fellow learners. They like to manage and control of their own learning. . So adult learners prefer to have

- Problem-based learning
- Real-life experience
- Active learning
- Varied learning styles
- Meaningful learning
- Action oriented learning
- Self directed learning
- Autonomous learning

PROGRAM DESIGN AND WEB

The primary epistemology, which guided the design and development of the web course for adult learners, is constructivism. According to the constructivist, learners construct different cognitive structures based upon their previous knowledge and what they experience in different learning verses.

It is believed that constructing knowledge requires teaching and learning strategies and an environment, which present learners with knowledge building structures. There are three distinct viewpoints of the constructivist epistemology: a personalistic view, the social point of view and academic modes of knowing . Each of these views provides important frameworks, Merickel (1997), for the design and development of on-line courses. The personalistic view focuses on the students and their interaction. It focuses on the individual personality within the context and assist individuals in understanding themselves and their relationship to the world. The social point of view centers on the students constructing knowledge together. This framework establishes that knowledge building is based on the social processes provided by the context. The academic modes of knowing, also known as the academic inquiry view, centers on the academic disciplines. This view poses that the function of schooling is to provide students with the academic tool set to assist them with constructing knowledge. Information processing theory provided a good framework for the use of academic tool set. In constructivism, learning is seen as a constructive process in which learners have an active role and learning is based on their cognitive functioning. The learners obtain new knowledge by constructing it on the basis of their earlier knowledge, upon their active functioning in continuos interaction with the surrounding reality, and from other learners.

Developing problem-solving and critical thinking skills are essential components for adult learning. PBL is a critical –thinking process whereby learners utilize systematic approach in isolating root causes of problems, which lead to corrective action. Researchers such as Davis (1992) and Perkins (1986) have championed instructional techniques that address student's divergent or creative thinking. WWW has provided a large array of tools and environment to implement instructional techniques that address the students divergent or creative thinking. Web browsing software now exist to explore and search, find pattern and relationship, rank ideas, view results and send findings to peers and instructor. Apparently, the Web is an ideal tool to nurture the students willingness to take risks, commitment to task, curiosity, openness to experience, broad interest, originality, imaginative play, intuition, attraction to novelty, artistic ability, metaphorical thinking, problem finding, elaboration of ideas and breaking away from the norm - all of which are attributes of creative people, Davis (1992), Young (1985). The anonymity of pen names and pseudo roles during electronic discussions encourages student idea experimentation and risk taking disclosure, Harasim et al. (1995). Some of the suggested techniques for web to enhance creativity in electronic environment are:

- Brain storming & Reverse brain storming : Focus on Idea generation
- Assigning thinking roles : Anyone in the roundtable is assigned a role
- Creative writings: One starts writing, another expands the idea.
- Just suppose you are education minister- what will be your priority?
- Idea-spurring questions: Suggestions to modify & improve.
- Semantic webbing: Give a word in the middle of semantic map, suggest attributes related to the concept.
- Simulation & Role-play: Role playing in simulated environment.

It has been observed that discussion and interaction under asynchronous conferencing in different time & different place tend to be more extended and engaging for the learners than traditional environment. Learners can reflect their opinion in much relaxed way and their own convenient time, which creates a congenial environment for creative reflection.

CRITICAL THINKING ON THE WEB

Critical thinking is reasonable, reflective thinking that focuses on deciding what to believe or do. Learners learn to look at a concept or phenomena aware of their own biases and approach the situation objectively and logically. Creative thinking on the other hand is the ability to form new combination of ideas to fulfill a need or to understand a specific natural occurrence. Despite extensive divergent thinking avenues, enhancing critical thinking pathways may be an equally strong dimension of the web. Some of the emergent ideas on critical thinking in web are:

- Graphic Organizer: Emphasizing on spatial representation like model, Venn diagram etc. It facilitates critical thinking by helping learner to sort out the hierarchy and logical flow of ideas.
- Ranking Methods: To rank and categorize brainstorming ideas in web.
- Reflection: Writing, to think, activities for reflection and critical evaluation.
- Mock trial & debate: Encourage to come-up with arguments.
- Case-Based Reasoning: Case study and comments

Any activity which encompasses search for cause and effect, find pattern and relationships, rank ideas, develop timeliness, build taxonomies is a worthwhile exercise of critical thought, Bonk & Reynolds (1997). In web, there are plenty of opportunities to enhance cause and effect relationship by using simulation and animation program in Web/ CBT packages.

Apart from implementing critical and creative thinking on web, there is a need to involve learners in planing and evaluating. Adult learners should be empowered to become self-directed learners, to define program goals, create exercises, and evaluate their own progress. Web-based training is well suited for collaboration between learners and the instructor because there is ample opportunity to communicate synchronously and asynchronously using various web tools. There is always need to design learning experiences that require adult learners to become actively involved. Graphics, videos, images, hypertext, and audio help adult learners understand concepts more easily than conventional text based presentations. Multimedia provides learners with alternative ways to examine problems and learn new skills. Adult learners like. environment in which learners are valued as individuals and feel comfortable participating. It is imperative to design online forums, exercises, and feedback loops with the above perspectives . The principal design consideration for developing online courses involves learning by doing, learning to learn, learning to digest and learning to feedback philosophy.

Adult learners need encouragement to explore new ideas and alternative ways of solving problems, critical reflection and group exercises. They always want to assume responsibility for their own learning which is the core of autonomous learning.

COLLABORATIVE LEARNING ON THE WEB

Earlier generations of distance learning media and methods were ill suited to the active learning model and had a bias towards straightforward teaching. More recent initiative on on-line learning can create the potential for new forms of collaborative learning through technology. It has spawned on-line learning which are based on a collaborative learning instructional paradigm rather than the self-instructional model of multimedia authoring systems. As such, they make extensive use of the asynchronous and synchronous collaborative tools available in web.

But simply making an on-line conferencing available and asking learners to use it is not collaborative learning. The way a learner learns in on-line setting has not been extensively studied. Most current use of on-line education transfers traditional classroom instruction to on-line setting, recasting reading into web based materials, lectures into on-line lecture notes or video clips and discussion into on-line conferencing, Bourne et al. (1997). Which is basically nothing but Internet based correspondence courses, which rely on information acquisition and reflect low level learning. Are we utilizing the real strength of collaborative technology while designing on-line courses? As we reposition our course materials from traditional to web learning, the paramount concern should reside on the question as to how to develop the features of a collaborative learning environment in true sense.

Unlike the teacher-centered models that view the learner primarily as passive recipients of knowledge, collaborative learning is based upon a learning team-centered model that treats the learner as active participants. The conversation (verbalizing) multiple perspectives (cognitive restructuring) and arguments (conceptual conflicts resolutions) that arise in co-operative groups may explain why collaborative groups facilitate greater cognitive development than the same individuals achieve when working alone, Sharon (1980), Webb (1989).

CONCLUSIONS

Designing and developing effective on-line courses for adult learners require a new approach to various pedagogical dimensions of on-line environment. There is a paradigm shift in educational practice of teaching and learning in web. Where learning through facts, drill and practices, rules and procedures was more adaptive in earlier days, now learning through projects and problems, inquiry and design, discovery and invention, creativity and diversity, action and reflection is more fitting for the present times. So there is a need to develop a conceptual framework on the pedagogical dimensions of on-line learning based on collaborative learning strategies. So there is need of an urgent pedagogical shift, Majumdar (1999), from instructivist to constructivist, behavioral to cognitive, didactic to facilitative, controlled to autonomous, fixed to open, interactive to collaborative, rigid to flexible, passive to active, surface to deep, content to learning to learn, learner centered to learning team centered approach to meet the demand of the on-line adult learners of next millennium. If on-line courses are designed incorporating the desired changes in pedagogical dimensions, the difference between teaching and training on the web and traditional methods for adult learners can be profound.

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INTEGRATING THE STRENGTHS OF THE WEB-BASED AND TRADITIONAL MODELS OF TEACHING

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Index: Pedagogy, Web-based instruction, teaching, vocational education, Hong Kong

Abstract: The Internet has revolutionized the way we communicate and created new paradigms for innovation in education. This paper discusses the pedagogical issues conforming to constructivism that educators may consider in the delivery of instruction in post-secondary vocational education. The roles of both the students and teachers must be redefined in the new paradigm. An intellectually exciting learning experience can happen in a classroom, a laboratory or the cyberspace. The art of combining the strengths of classroom face-to-face teaching and Web-based self-directed instruction will be a challenge to educators. In addition to management support and a fair reward system as drivers for improvement, success in the integration of information technology in teaching will rely on teams of teachers who are committed to learning, experimenting, collaborating and sharing their knowledge.

INTRODUCTION

In the past few years, the implementation of Web-based teaching has grown dramatically. Pulled by the demands for lifelong education, many tertiary institutions have become global educational enterprises and distributed their learning programmes to anywhere a telephone line exists. Other institutions adopt Web-based teaching to supplement traditional classroom teaching under the threat that if they are not ready for this new technology, they may lose the best students. Many institutions have realized the need to fundamentally re-think the design and delivery of education for the community, in order to fulfill local community needs as well as the demands for lifelong learning in the global knowledge society.

This paper discusses the pedagogical issues conforming to constructivism that educators must consider if they are to maximize the benefits of Web-based technologies for teaching and learning. Researches indicate that a major reason for past failures of IT projects has been the lack of knowledge and skills of teachers in mastering the tools and integrating them into the curriculum. No matter what strategies or tools we use, the needs of the student must be in focus. We shall share what we have learnt from our Web-based teaching pilot project in which we were given a limited period of time and no additional funding.

THE CONSTRUCTIVIST VIEWS OF TEACHING AND LEARNING

Many scholars describe learning as "that reflective activity that enables the learner to draw upon previous experience to understand and evaluate the present, so as to shape future action and formulate new knowledge." Most education reform programmes in the 90s are rooted in the constructivist theory of learning (Riel and Becker, 2000). **Constructivism** emphasizes that learning is a process of active knowledge construction, not passive knowledge recording or absorption. Learners use current knowledge to construct new knowledge base from direct interaction with sources in the environment. Through social interaction, they actively create meaning out of their individual and group constructions of reality. Learning is context dependent, and highly tuned to the situation in which it takes place.

Reformers advocate a move away from traditional, teacher-centered, didactic instruction, where students are just passive receptors of knowledge, toward more student-centered and constructivist teaching that focuses on inquiry and experimentation. The new pedagogy redefines the classroom as a community of learners in which speakers, readers, and writers come together to define and redefine the meaning of the academic experience (Garcia, 1999). It also redefines the teacher's role as coach and facilitator of learning. The "learning by being told" model of instruction is believed to be not very useful for the active learner. The traditional and the constructivist approaches to teaching are compared in Table 1.

	Traditional Classroom Teaching	Constructivist Teaching
Educational Philosophy	Knowledge Transmission	Co-Construction of Knowledge
Role of Teacher	Delivers information in a structured coherent order	Coach, guide, Learning Community facilitator
Role of Learner	Passive reception of information	Share interests, learning and knowledge with others
Concept of Knowledge	Accumulation	Transformation
Teaching/ learning Process	Association, memorization, conditioning-rewards & punishments	Problem solving, inquiry argumentation, dialog and debate
Assessment Process	Tests of retention of information	Performance portfolios, projects

Table 1: The changing paradigm of classroom teaching. (Adopted from Riel and Becker, 2000 and the Report on Integration of Educational Technology into the Design of Schools for the Future in Queensland (June 1997)).

From a more practical perspective, Chickering and Gamson (1987) describe the essences of good teaching in terms of seven principles of good practice. These seven principles apply equally well to online instruction (Chickering and Ehrmann, 1998). They are given below:

1. Good practice encourages contacts between students and faculty.
2. Good practice develops reciprocity and cooperation among students.

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3. Good practice uses active learning techniques.
4. Good practice gives prompt feedback.
5. Good practice emphasizes time on task.
6. Good practice communicates high expectations.
7. Good practice respects diverse talents and ways of learning.

CLASSROOM TEACHING

Classroom teachers who define instruction as the transmission of knowledge have students learn concepts and skills through listening, copying text, and practicing sets of similar problems. Classroom teachers who define instruction as the co-construction of knowledge focus on project activities that expect students to display understanding, interpretation, and original thought.

Riel and Becker (2000) examined the pedagogy of the Teacher Leaders in secondary schools in the United States revealed that the pedagogy of the Leaders was closely tied to the constructivist philosophy. Their classroom activities supported more cognitive challenges, encouraged project work that was extended through time, and encouraged students to work together and to share what they had learned with one another.

Face-to-face contact in and out of class meetings is an important factor in student motivation and involvement. This is particularly true for post-secondary vocational education of youths who enroll in their vocational courses as a second choice in tertiary education. In the absence of any face-to-face interaction, it would be difficult to inspire the unmotivated students so that they feel a desire to learn.

Active learning involves students in the classroom engaging in thinking and interacting with their peers. The teacher has a number of techniques at his/her disposal, such as questioning, discussion, small-group presentations, role plays and case studies.

WEB-BASED TEACHING

The online learning environment enables anytime and anywhere accessibility of teaching materials but technology cannot change the fact that a good course still requires a good teacher. It does not mean that a course will become better simply by putting the curriculum on the Web (Ricketts *et al.*, 2000). Teachers have to exploit the strengths of web technologies and new pedagogies that emerge with alternative ways of communication. For instance, using audio with video can promote engagement of multiple brain channels, resulting in higher retention. Graphical simulations can facilitate understanding of complex concepts. The teaching/learning materials must be functional in addition to accessible. Web-based instruction needs to follow good instructional design principles and conform to good teaching practices and sound Web design principles (Rice et al., 1998).

A pedagogical model of learning by investigation was employed by Badcock et al. (1996) in their project of using the Web to teach fluid dynamics. Rather than simply presenting information, the course was designed to involve the students in the learning process by encouraging them to think about the subject. This was achieved via a question and answer system, which works in this manner: the student is given some information, then asked a question. The student should try to reason out an appropriate answer from a choice of three or four alternatives. The student is given feedback in the form of text with illustrations, video, or animation.

An example of applying constructivist approach in online teaching was described by Downing and Brown, (1997). Rather than simply using the World Wide Web for providing information, students are asked to develop and review such material themselves in their course on Personality Psychology. Students are required to publish their work on the Web. An email list is used to facilitate discussion. After peer review, the material becomes part of an online course hypertext. The process encourages students to develop their understanding of the topics and gives them the satisfaction of knowing their work is seen and appreciated by a wide audience. Experiences show that students would produce work of higher quality if they know that their work will be viewed by a large audience.

The availability of electronic discussion groups and student assignment work on a teaching web site permits learning take place outside class meeting session. It facilitates peer learning by allowing students to evaluate their performance against that of their peers.

Computer mediated communication technology has simplified the task of creating a Web-based learning environment that would allow learner-content interaction, learner-teacher interaction, and learner-learner interaction. Teachers could focus on the design of learning activities that engage learners in these three different modes of interactions regularly.

Rice et al. (1998) argue that: "creating good Web-based instruction is not simply putting lecture notes online nor is it merely creating a virtual library of links to content related sites. It includes ensuring that good instructional, teaching, content, cognitive, visual, and usability design principles are followed as well as ensuring that it fulfills both teacher and student needs."

THE INTEGRATED MODEL

Combining the advantages of both the classroom and Web-based models of teaching provides an opportunity for enhancing the quality of both on-campus and online distance education courses. The strategy is fully compatible with the constructivist learning framework that associates with interactivity, social presence, cognitive strategies and collaborative learning.

Teaching in an online environment opens up new ways for creative teachers to guide and facilitate learning experiences. Teachers must focus on which learning activities are to be put on the Web and how these activities are integrated with classroom teaching. To decide the appropriate teaching strategies that match learning outcomes, individual learning style and effective linkages between curriculum, pedagogy and assessment remains a major challenge to the teacher.

IMPLEMENTATION OF WEB-BASED TEACHING

There are four disciplines of studies at Kwun Tong Campus of IVE : Business Administration, Computing, Electronic and Electrical Engineering, and Printing. In the past 10-12 months, as a pilot project of implementing web-based teaching, our colleagues dedicated their time and effort on the design and development of courses and modules on WebCT while training was taking place in the meantime. WebCT is a popular online course delivery tool currently used by many tertiary institutions. In addition to posting teaching and learning materials on the platform, some of them explored the functions of online quizzes, bulletins, mail, glossary and chat-room. Students taking Year One and Foundation Diploma in the four disciplines have completed a questionnaire survey to provide data about their current use of WebCT. Small groups of students from these disciplines have been given focus group interviews to invite more specific comments on the platform.

STUDENT ATTITUDES AND PERCEPTIONS

Focus Group Interviews Students find WebCT useful and practical in completing a number of tasks. They can download worksheets, handouts and lesson notes; submit assignments and upload projects; obtain model answers for tests or assignments; and send e-mails to teachers. Some of them also read the bulletin for more information. The CP students particularly appreciate the platform for they can practise what they have learnt on computer knowledge and skills on WebCT. In general, students can make use of WebCT mainly to perform administrative tasks for their modules whereas their exploration of other functions like self-learning, exchanging ideas and sharing information remains minimal.

Yet, some students have complaints regarding the administration of the platform. At the moment, off the campus, WebCT can only be accessed through an external Internet Services Provider (ISP). Majority of the students are reluctant to change their current ISP to another for access to WebCT. They also complained that the speed in downloading was low.

Majority of the students are satisfactory with the present teaching approach of lecture/tutorial/practical sessions together with web-based teaching. One essential remark from students is that an ideal learning approach will be composed of lecture/tutorial/practical sessions to be supported with the web-based instructions for self-study purpose.

Students have made suggestions as to how to improve the management of online courses. They suggested that WebCT should be accessible at home through any ISP for all students. It is of utmost importance that each student has an account in all the modules he or she is taking. The institute should exploit the full advantages of web-based instruction, promote and train students in all the features and functions of WebCT. All the modules should be posted with sufficient and useful materials on the platform, and also be more attractively and colorfully designed with graphics and animation. All the teachers should post model answers for tests/assignments on WebCT. Finally, the institute should provide an area on WebCT for students to post comments and ask questions on IVE matters.

Questionnaire Survey A questionnaire survey has been conducted to evaluate the results of the pilot Web-based teaching project in May, 2000. Questionnaires were sent to 705 first-year Diploma/Higher Diploma students from four academic disciplines of the Kwun Tong Campus. A total of 308 valid returns were received, corresponding to a response rate of 43.7%. The analysis of the data showed that:

- The majority of respondents (56% overall) are willing to spend 1 to 5 hours per week on Web-based instruction (Figure 1) and there are 21% willing to spend 6-10 hours on the same task. However, 6% of the students dislike Web-based instruction and opt for zero hour.
- Students consider that Web-based instruction should occupy about 10% of their total learning time. Figure 2 shows the percentage distribution of average time for various learning activities preferred by students.
- 60.9% of the respondents rate the quality of the learning materials presented in WebCT web sites as satisfactory or better.
- The results of the perceptions of the effectiveness of Web-based instruction are only fair. There are significant differences in the rating of the effectiveness of WebCT in improving learning on a 0 to 5-point scale among the four disciplines. The highest average score for the best discipline is 2.24 while the lowest average score for the worst discipline is 1.56.

LESSONS LEARNED

Staff interviews have been conducted to find out teachers' opinions and suggestions on the implementation of web-based teaching in our campus.

Staff Feedback Except for the Computing Section, only a small number of the staff of the other 3 departments were able to fully utilize the platform for online teaching and learning. Initially, the major reason would be the Computing staff are better trained and equipped in this area of knowledge and skills. Another reason is the lack of computer set-up in the classrooms which seems to discourage web-based teaching and learning in class.

There is a variety of communication tools on WebCT including courses content, bulletin board, private mail, F.A.O., calendar, on-line quizzes, course tools and other useful links. These features and functions enable the designer to post various types of information on the platform for learners. Without additional resources and support, the teachers have to take up the role of designer for their own modules. Majority of them have uploaded their teaching materials on the course content but are not familiar with the other communication tools of WebCT which requires more learning and practice before one can master them. It is difficult for the teaching staff to spare sufficient time on designing the online course materials in addition to their teaching and administrative workload.

Drawbacks of the Present System Limited accessibility to WebCT both on and off the campus is a major drawback in the implementation of web-based teaching and learning. It was reflected that staff need more support on clerical work and graphic design, besides continuous and systematic training on the tool. Moreover, students need to be motivated and trained to fully utilize WebCT, especially on the tools for exchanging and sharing information on the web, like bulletin and chat-room.

Looking Forward The overall effectiveness of the pilot Web-based teaching project has reached only a fair level in its first year of trial. Looking forward, there need to be measures which encourage and enable students to change their attitude about learning and understand both their own role and the teachers' role in a constructivist approach. We propose the following guidelines for the next phase of the project:

- Provide formal training to students who need detailed instructions on how to use the Web-based instruction tools.
- Plan for learning activities that demand students to use the various communication tools in WebCT for exchanging ideas and sharing information.
- Encourage the production of multimedia-rich contents that facilitate learning.
- Reward staff who are eager to experiment and devise useful Web-based learning activities.
- Continue to provide staff development training in the use of IT in teaching.
- Provide additional support to staff on the production of courseware.
- Identify and disseminate successful practices.

CONCLUSIONS

The Internet has revolutionized the way we communicate and created new paradigms for innovation in education. No matter what strategies or tools a teacher uses, the focus must be student-centred which means learning outcomes, individual learning style and effective linkages between curriculum, pedagogy and assessment. An intellectually exciting learning experience can happen in a classroom, a laboratory or the cyberspace. The art of combining the strengths of classroom face-to-face teaching and Web-based self-directed instruction will be a challenge to educators. In addition to management support and a fair reward system as drivers for improvement, success in the integration of information technology in teaching will rely on teams of teachers who are committed to learning, experimenting, collaborating and sharing their knowledge. The government needs to invest more money on web-based instruction if it wants to see advances in this direction, but should never replace teachers with technology.

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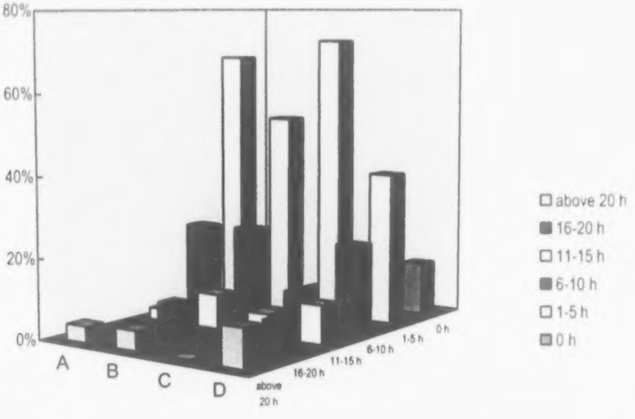

Discipline	above 20 h	16-20 h	11-15 h	6-10 h	1-5 h	0 h
A	4%	1%	3%	23%	67%	2%
B	5%	9%	9%	23%	51%	3%
C	0%	0%	6%	8%	72%	14%
D	10%	8%	10%	22%	38%	13%
All	5%	5%	7%	21%	56%	6%

Figure 1 Percentage distribution of students who are willing to spend on Web-based instruction (categorized by disciplines and hours per week). (*n* = 308)

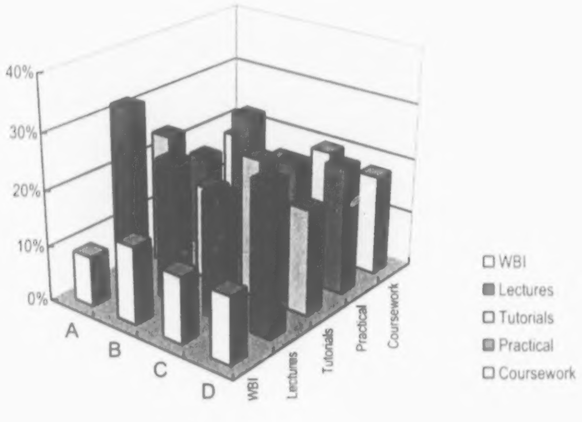

Figure 2 Percentage distribution of average time for various learning activities preferred by students of disciplines A to D. (*n* = 308)

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WEB-SITE TEACHING: ANALYSIS OF ITS FUTURE DEVELOPMENT

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Index: Teaching method, life-long learning, education technology

Abstract: Web-site teaching has become increasingly popular in universities and continuous education. This article discusses the advantages of web-site teaching. In particular the effect of web-site teaching on life-long learning is examined. It is concluded that web-site teaching will have large scope of future development and that education institutions especially those aiming at providing life-long learning to mature working people will need to start preparing for this revolutionary change in method of teaching.

INTRODUCTION

The use of IT in education has become a trend nowadays. In particular, web-site teaching has become increasingly popular in University teaching. Indeed technology has developed so rapidly that methods of teaching unheard of a decade ago are commonly used now. Development in information technology has not only transformed the way of communication, but has exerted its influence in education and has changed completely the traditional method of teaching.

There are motives for teachers and lecturers to adopt new information technology in their teaching. Firstly, the adoption of IT considerably enhances the effectiveness of teaching. Secondly, IT such as web-site teaching provides a high degree of flexibility for the students in pursuing their study. They can study at home or in their work place in front of computers connected to the internet. They can study at the time convenient to themselves and at a pace suitable to themselves. Thirdly, IT such as web-site teaching has considerable cost advantages to the teaching institutions since it does not require much classroom resources and needs only the minimum face to face teaching, the result of which is substantial savings in manpower. Lastly, but most importantly, IT such as web-site teaching provides the path for life-long learning which has been so much stressed nowadays as a human resource policy.

THE ROLE OF 'IT' IN RAISING TEACHING EFFECTIVENESS

Education nowadays is no longer the privilege of a small group of people in society. It has become something that everyone has the right to access. Education has the effect of satisfying human want for knowledge. The acquisition of knowledge itself raises a person's self-esteem, confidence and brings about happiness. Education viewed this way is consumption in the words of economists.

However education is now generally regarded as investment rather than consumption. It is an investment in 'human capital'. The acquisition of knowledge yields a return, which is the higher income to be earned in the future. People are thus motivated to make effort to study. Study is therefore seen as an effective tool to combat poverty and to improve one's standard of living. Education has become a way for upward social mobility. (Schultz T.W. 1960)

With the great increase in demand for education, and the policy of the government to expand education, teaching institutions especially the universities are under tremendous pressure to increase supply of education, and more precisely, of good quality education. The traditional form of teaching whereby the teacher conveys the subject matter of a discipline verbally and through writing on the board is no longer sufficient. Audio and visual aids are needed to help teaching. Computer teaching is a great progress, as interest of the students can be considerably enhanced. Now web-site teaching, an elevated method of computer teaching, provides the maximum flexibility and efficiency for teaching.

There have been great disputes on what should be considered as good teaching. Classifications such as 'teacher centred teaching and learning', 'student centred teaching and learning', 'surface approach of teaching' and 'deep approach of teaching' etc have been under discussion by academics in education. But it is generally accepted that good teaching occurs when students succeed in acquiring knowledge and are able to make use of the knowledge, i.e. to apply it. In this respect, IT is an effective instrument to bring about good teaching, as it provides efficient communication through which the subject matters of a discipline are transferred from the teacher to the students and feedbacks are transferred from the students to the teachers. IT being a fast and powerful means of communication indeed is an effective instrument for teaching.

FLEXIBILITY OFFERED BY WEB-SITE TEACHING

The idea of 'consumerism' has been increasingly becoming popular in education. Education is now considered as a good which consumer buys. As such education needs to be of good quality, to fit the purpose of consumers and to be distributed to them at the time and place most convenient to them. Web-site teaching can adequately fulfil these requirements. A student with a computer connected to the internet is able to pursue his/her study at the time convenient for him/her, at the place that suit him/her, and at the pace that fit his/her ability.

The change from traditional programme-based system to credit-based system is in fact a step to provide flexibility to students in programming their studies. Web-based teaching provides further flexibility to the students in managing their studies. When credit-based system is combined with web-site teaching, flexibility becomes really great!

COST ADVANTAGE OF WEB-SITE TEACHING

As the demand for education increases, increase in supply should follow. Teaching institutions especially the universities are now under heavy pressure to supply education for more students. However as education is costly, most governments are reluctant to provide substantial funds to the teaching institutions. In view of this web-site teaching is a feasible solution to the problem. It allows teaching to take place for numerous students at the same time. So there is tremendous economies in the delivery of lectures as it saves classroom resources and manpower resources. The idea of ciber-universities has emerged whereby a university may teach only through web-site, running its educational programmes with very low costs.

With web-site teaching, the market for the ciber-universities is enormously expanded. Its market is not limited by geographical constraints as the internet can reach every location in the world. So web-site teaching does not only lead to cost savings, but to great increase in the demand for its services.

ROLE OF WEB-SITE TEACHING IN LIFE-LONG LEARNING

Traditional thinking is that one needs only to take up enough studies for acquiring a job or engaging in a profession. As knowledge and technology are continuously increasing and improving, it is now generally recognized that learning should be a life-long process. This is a "cradle to grave" perspective of education.

Life-long learning challenges the notions that learning belongs only to the classroom and the idea that learning is essentially a pre-experience formative process. Life-long learning requires the rethinking of the functions of education institutions and the nature of learning in a knowledge-based society. (Chris Duke, 1999, p.22)

Life-long learning have made the traditional study programme not quite workable. Students in a programme may come from all age and background. Full- and part-time students are not easy to identify clearly, with respect to their background, study programmes or employment status. Young and mature age, working and non-working, degree-seeking or for personal interest, now are likely to be taking part in the same teaching learning process. This is the picture of life-long learning. (Alan Wagner, 1999, pp.58-59)

In deed life-long learning has been put into the aim of university education. Students are supposed to be educated in such a way as to be able to pursue life-long learning after leaving college. The provision of a scheme for life-long learning is now the concern of most governments. It is their preoccupation to set up schemes which are effective and inexpensive for providing life-long learning to their people.

The flexibility offered by web-site teaching can contribute to the life-long learning process. It is envisaged that more and more adults will be engaging in study programmes through internet teaching. There will be more adults enrolling in degree courses doing their studies part-time through internet teaching. Those who want to up-grade their knowledge of their work or profession will enroll in specially designed courses taught through the internet. Continuous study is so easy and convenient with a computer connected to the internet.

In providing life-long learning through Web-site teaching, effort must be made to design course materials for different categories of students. According to Martin Trow (1999, p. 207) we should disaggregate the pattern of use of IT very finely along at least four crucial dimensions, i.e. by the nature of the subject taught, by the location of the student (whether inside a college or university or at home or at the workplace), by the purpose of the instruction (whether to transmit skills and knowledge or to cultivate mind and sensibilities) and by the academic talents and motivations of the learner.

Policies in life-long learning must be set to suit the diversity of student population. It is inevitable that experiments are to be taken with initiative from below rather than from top. According to Martin Trow (1999, pp.207-208) if the provision of lifelong learning is to suit the diverse student populations, then policies for continuing education through the new media of communication must be responsive to the nature and goals of the educational effort, almost course by course, to the market for knowledge among consumers and to the judgement of the academics who know better than anybody who they are teaching and how those students learn. How these conflicting requirements – of function, demand and pedagogy – balance out cannot be the subject of general rules or state policy. On the contrary, it means that policies must allow – indeed encourage – experimentation by those who introduce the use of these technologies into higher education, and especially into distance learning. He therefore advocated that institutions and the people in them should be given the freedom and resources to initiate from below and to experiment in different directions, and that policy-makers must accept the possibility of failure in some cases. (pp.207-208)

Researches are urgently needed to find out the impact of web-site teaching on life-long learning. Such impacts are complex in nature. The convenience of taking up a course through internet may increase the demand for such courses. The response to the availability of web-site teaching may be different for different categories of people. The pursue of life-long learning may change the life-style of people, their family relation, their spending pattern, their interest and so on. All these aspects are unknown, as the outcome will take place only in the future. (Martin Trow, 1999 p.203)

RESISTANCE TO ADOPT WEB-SITE TEACHING

In spite of the advantages brought about by the introduction of IT especially web-site teaching, there is resistance from some teachers and students. New education technology has impacts both on the teachers and the students. On the one hand, new technology helps to increase the efficiency of teaching on the part of the teachers and provides greater degree of self-study and critical thinking on the part of the students. On the other hand, there is resistance to change since it is new and requires efforts to acquire the skill for the adoption of the new technology.

Some teachers or lecturers who are already accustomed to the traditional way of delivering lecture may find using computer teaching especially web-site teaching difficult for several reasons. First, they have to learn the new technology before they can make use of it. Second, they have to rewrite all their teaching materials and input them into the computer, which requires substantial works. Also repeated testing of the teaching materials is needed before they can be used. Third, there is considerable risk associated with the outcome of computer teaching. Students may not be able to follow. They may not like it. They may need assistance in order to use it. Therefore it is something new and a risk-avert lecturer by nature would reject it.

With computer-facilitated learning, increased independence on the part of the students has become a goal or a desirable side benefit of the innovation. These innovations generally have direct or indirect impact on other aspects, such as coursework and assessment, which further provides opportunities for increasing the self-reliance of the students. However the innovation may not be accepted instantly by the students. So measures must be taken to ensure a smooth shift to the new educational technology. Otherwise, discouragement on the part of the students will bring about failure in the teaching-learning process. Many students still have the concept that teaching must be in the classroom and with the assistance of the teacher near by. However in web-site teaching, the student is left alone sitting before the computer without a classroom environment and unaccompanied by his/her class-mates. This is a complete change of the mode of teaching and learning. So there must be a kind of preparatory works to smooth out the psychological shock of such a change. (Akerlind and Trevitt, 1999, pp.97-98)

It is advisable that the adoption of web-site teaching be carried out in two stages. In the early stage some web-site materials are posed in the web-site so that students can have access to them. But at the same time lectures and seminars are still provided. In this way students will have the chance to attend lectures and seminars. In the later stage, teaching will then be carried out totally through the web-site. With such a transition arrangement students will find it easier to adapt.

The above transition arrangement will also be beneficial to teachers and lecturers, as they can have more time to prepare their web-site materials. In the early stage, they need only to prepare notes, multiple choice questions, basic activities, etc., which they may already have prepared for the traditional lectures and seminars. It is only in the later stage that they need to up-grade their teaching materials for a complete web-site teaching. Also it is advisable for the teaching institution to provide technical assistance to the teachers and lecturers for the preparation of the web-site materials. In the Hong Kong Polytechnic University, funds have been granted to the Education Development Unit to help teaching staff to carry out web-site projects. These funds are used to employ technical staffs and students helpers for the preparation of materials for web-site teaching. Staffs are thus encouraged to embark on these projects without the feeling of being forced to adopt the innovation.

CONCLUSION

What conclusion can then be drawn? Certainly the use of IT especially web-site teaching will become increasingly popular. The impact of introducing web-site teaching on traditional methods of providing teaching is great. It changes the way teaching is conducted. It changes the structure of the education system. It changes the views of people on learning. Its effects spread into practically all aspects of people's lives.

As educators, we must be prepared for these changes. We need to up-date our skill of web-site teaching and to design programme materials for web-site teaching. We need to research on the possible effects on teaching and learning because of the adoption of web-site teaching. Indeed there will be a renewed emphasis on teaching as against research. (Sarah Guri-Rosenblit 1999, p.286)

For institutions that target at the life-long learning market, there are lots of areas they should consider. How is the development of such a market? What are the products demanded by the consumers? How large is the market? How should the market be served?

As the competitors in this market are many, i.e. the universities, the vocational training institutions, overseas educational institutions, etc., competition will definitely be keen.

For certain, things are to change tremendously and rapidly. It is time now for us to make plans and provisions for the changes. A new era has come in which information technology will play the main role in education.

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USING THE WEB TO ENHANCE LANGUAGE TEACHING AND LEARNING AND DISTRIBUTED COGNITIONS IN A CONVENTIONAL SUB-DEGREE SETTING

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Index: IT, Distributed Cognitions, interaction, English teaching

Abstract: This paper examines the functions and uses of IT, specifically the internet for educational purposes in general, and for the teaching and learning of English in a sub-degree course in particular. The design of an exercise in an English course at sub-degree level, with the objective of using the web to encourage interactive discussion among students and staff and the development of distributed cognitions (Pea, 1993) and "person-plus" (Perkins, 1993) in the students, is looked into and its effectiveness analysed. Some of the problems arising from the exercise are discussed as well.

INTRODUCTION

The buzzword which is carried over from the last decade of the 20th century into the new millennium is information technology (IT). To the information technologists, the internet, which makes a significant component of information technology, is an epoch-making idea and the most transforming invention in human history. The internet is predicted to turn business "upside down and inside out" within a year (The Economist June 26th 1999, *Business and the Internet,* p.1). If information technology is expected to have such revolutionary effect on the business world, what impact does it have on education, and in particular, language education, which is considered particularly resistant to the application of information technology?

This paper sets out to examine the use of IT for educational purposes at tertiary level, with a particular focus on how the web is used to improve the teaching and learning of English, and to enhance the learners' distributed intelligence in a conventional educational environment (conventional vs. distance learning type) at sub-degree level.

BACKGROUND TO THE USE OF INFORMATION TECHNOLOGY IN TEACHING AND LEARNING AT CITY UNIVERSITY

The case study this paper examines is based on the development of a web-based exercise in an English course in City University of Hong Kong. Despite the availability of many high-tech computer facilities in the City University of Hong Kong and its high-tech image, much of the use of computers in the teaching and learning of many courses (particularly humanities ones) at the end of the millennium has been restricted to the use of PowerPoint slides in lectures, and the use of email for staff-student communication outside the classroom. For the more innovative teachers, their attempts in using IT have been limited largely to putting PowerPoint slides, course materials, tests and exercises on the web for student access. As stated in the University's Strategic Plan for the Development of Information Technology announced in May 1999, the predominant use of IT to support learning, teaching and research throughout the University "will revolve around the Internet and the growing use of the Web to present course materials and to assist in the complex process of course management".

The language teachers in general have been rather sceptical about such applications of information technology as most of the language teaching is done in tutorials rather than lectures, hence putting PowerPoint slides or course notes of lectures on the web is not relevant. On the other hand, putting multiple choice or fixed answer type of exercises or tests on the web represents a very limited type of activity which is too restrictive for teaching and learning of languages at an advanced level when students are encouraged to use the languages more for creative and interactive purposes. Many of the language teachers believe that since much of language teaching and learning should be done through face-to-face or interpersonal interaction, computer-mediated communication, which obviates face-to-face interaction, will severely constrain it.

While many language teachers realise that they need to change and adapt some of their teaching methods and approach to incorporate the use of IT so as to meet the stated institutional goals and strategies, they need to think hard on how they can use IT profitably to enhance interaction. To be able to maximise the benefits of IT, it is necessary for them to understand what the new technology involves, what opportunities it can and cannot afford. As Fullan rightly points out, for change to be brought about effectively, those responsible for implementing change need to make sense of what change is about and why it is being suggested (Fullan, 1982). As frontline change agents, we need to face change 'head-on", "exploiting change before it victimizes us" (Fullan, 1991:345).

CONTROVERSY ABOUT THE USE OF IT IN LANGUAGE EDUCATION

Much of the negative feelings about the use of IT in education paradoxically arise from what is originally its strength. The expectation that the use of IT "will free education from the constraints of time and space", as proclaimed by a UK university vice chancellor (M.Fitzgerald, Times Higher, July 1996), strange enough is also perceived as a threat and a limitation. Besides the fear that such development "threatens the sense of community inherent in conventional institutions that is so valuable to students" (Light and Light, 1999: 162), there is also a fear that students will be cut off from interaction with each other in communicating with and through the computer, as Light and Light (1999) point out, "Information technology is sometimes seen as threatening to cut learning off from the interpersonal contexts which give it meaning and utility" (163).

A closer look at what learning involves will reveal that it is not just "a property of the minds of individuals" as many people believe (Pea, 1993: 47). As Pea points out, practices of cognition or learning rarely works alone. In Pea's terms, human cognitions are distributed, "The intelligences revealed through these practices are distributed – across minds, persons, and these symbolic and physical environments, both natural and artificial" (1993: 47). It's only through activity that "connects means and ends through achievements" (ibid.: 50) that distributed intelligence is manifest and realised. Hence learning in educational settings, should not be concerned largely with solitary intelligence as they seem to have been now, but rather, it should be concerned with the development of intelligence distributed across minds and persons through fostering interactive activity. Pea also argues that "computer technologies mediate human interactions with nature, information and other persons in distinctly different ways" (ibid., :57), just like the use of physical machinery in farm labour.

Harping on a similar note, Perkins (1993) advocates the ideal of an educational process "oriented more toward the person-plus, empowering learners to capitalize with greater awareness and art upon the cognitive resources afforded by the physical and human resources around them – indeed, empowering learners to construct around themselves their personal "plus", their own surround for an agenda that will evolve with that surround" (Perkins, 1993:106). It is important for an educational institution such as a university to encourage interaction in a group which "involves a multitude of complications and a maze of cross-talk not encountered in solo decision making" (ibid.: 98). Hence any use of the web for teaching and learning purposes should help empower the learners to make full use of the physical and human resources around them through interaction and collaboration.

Language teachers are particularly concerned about the development of the person-plus and enhancement of distributed cognitions among the learners, because language as a form of social behaviour involves communication between, and among people (Oxford, 1990: 144). As language learning involves interaction with other people and social strategies are very important in the process of learning a language, IT will have to be able to enhance interaction.

Can IT enhance interaction? In offering a socio-cultural perspective on the human-technology link, Säljö argues that it can. He points out that the full realisation of the potentials of such experiences "will rely on students' access to conversation partners who carry on discussions". He stresses that "technology should not be seen as replacing such communication but rather as providing a resource for supporting it" (1999: 159). Even in 1989, Graddol already points out that one of the advantages of computer mediated exchange over interaction in face-to-face settings is that it does not depend in the same way upon interruption and attention-getting skills. Bannon (1995) also argues that computer-mediated exchange can provide opportunities for those students who are too inhibited to speak out in face-to-face situations.

Fetterman (1998) in discussing the beneficial use of the web for educational research and instruction, cites the case of "virtual classrooms" that he set up on the web at Stanford as an example to illustrate how the web could be used for generating interactive discussions. A discussion is generated through the critique he provides of students' assignments posted onto a series of folders, as well as criticisms and comments from the peers. He sums up the benefits to be "the ability of students to see one another' work and thus benefit from a peer review, time for thought and reflection through posted comments, the ability to save or archive discussion for analysis or additional discussion, the ability to conduct classroom instruction or to post messages while travelling or being on site" (28). However, he also acknowledges that there are some problems such as "initial difficulties navigating around the virtual classroom and visibility" when "everyone is on display" and "faculty need to respond to each student's comments". The benefit of transcending "the boundaries of the classroom" is both a benefit and a drawback: the extensive discussions leading to endless dialogue incurs much more "additional discussion time" (ibid.)

In looking into the case of skywriting (a term coined by Harnad (1990) to refer to the use of multiple reciprocal e-mail in academic discussion) in the University of Southampton, Light and Light (1999) report a very similar interactive experience using the web for discussion which resembles that of a symposium (165). However, they also find that the predominant mode of exchange is one of question and answer rather than critical comments which the students feel uncomfortable about. They observe that even at this level, students seem to have difficulty in separating personal criticism from criticism of ideas. (ibid., 1999: 171-175). Furthermore, none of the students in the skywriting project "would willingly have sacrificed face-to-face sessions in favour of skywriting" (ibid. 1999:175). That means the use of such information technology can only have a supportive role and cannot replace face-to-face contact, and hence cannot save educational institutions from the constraints of time and space.

THE DESIGN AND IMPLEMENTATION OF A LANGUAGE TEACHING ACTIVITY USING THE WEB

With the discussion on and examples of what IT and the computer could and could not do, as well as should and should not do for teachers and learners in the background, the designer of an English course in City University of Hong Kong then set out to develop a web-based activity in writing in the first Semester of 1999. Understanding that in a software package developed by University of British Columbia called WebCT, there is a bulletin board feature which is a kind of chatroom, allowing users to post their writing and readers to respond, the designer of this English course decided to use this feature for developing a writing exercise.

This English course concerned is the first common English course offered to the first year students of four sub-degree language programmes, which are Higher Diploma (HD) in Applied Chinese Studies, HD in Applied Japanese Studies, HD in English for Professional Communication and HD in Translation and Interpretation. The English level of students varies a great deal as these different programmes have different admission requirements for English. The students' level of competence in English in this course can vary from that of the very competent second language users to that of the relatively weak ones.

As most of these students come from a secondary school environment which is teacher-centred, the assumption is that students who have come through an educational system as such usually have not had much opportunities to use the language actively for interactive purposes. One of the purposes of the course is to activate students' competence in English as a second/foreign language, which they have acquired in both their primary and secondary education, and provide them opportunities of putting their latent competence into active use. To encourage students to express their ideas freely and to practise their writing skills, the course designer previously developed a journal writing exercise, asking students to write three journals in several weeks. However, the exercise was done by students individually, with practically no element for sharing of ideas, not to mention collaboration, among the students.

The course designer saw the bulletin board feature of WebCT as a very good tool for developing collaboration and distributed cognitions among students and decided to modify the previous writing exercise to incorporate the use of this feature. Instead of asking students to write three separate journals in several weeks, the designer assigned each tutorial class two weeks for collaborating in writing journals/diary entries to cover each day of the designated two weeks. Different classes were assigned different weeks for posting the journals onto the bulletin board on WebCT set up for the course. Students were also asked to ensure that there were more than two journal entries for each day as they were asked to select the best journal(s) for each day to be posted onto the bulletin board. The students had to work out among themselves a roster system in which the journal entries on each day were covered. To ensure fairness, they discovered that they had to discuss among themselves in class a way of assigning the writing task so that no one would have an "unfair advantage" over the others. (Students having to write the journal on weekdays were perceived as having drawn a short straw and those who had to write on a Saturday or Sunday as having an advantage since they would have more time to do it and they might have more to write about as well). So even in working out a reasonable and equitable work schedule among themselves became a good opportunity for training not only their spoken English communication skills, but also their distributed cognitions and 'person-plus' in problem solving. It also provided students a good reason for collaborating with each other in working out a reasonable scheme. Furthermore, the fact that their journal entries would no longer be restricted to the readership of the tutor, but rather, would be read by the rest of the class, and if written well, would be read by other students and tutors of other classes, gave them the desire and motivation to put more effort and thinking into the writing task.

After writing out their diary entries, students were asked to bring to class a hard copy of their journals and post them up on the walls and boards in the classroom according to the day of the entries. Students were asked to walk around in small groups of two to three, reading the posted up journal entries, giving short written comments and suggestions for improvement on the side or at the end of the journal, which was another opportunity for students to collaborate with and help each other in writing. Afterwards, students were to select among themselves the better written journals for the day to be posted onto the course bulletin on WebCT. Over the selection process, they had to justify to the other students in the class why they thought a particular journal was better written than the others. Students whose journal entries were selected were asked to do revision, taking into account of other students' comments and suggestions, before posting the entries onto the WebCT bulletin board for the course.

Following that, students were encouraged to log onto the bulletin board of the course on WebCT to read the journal entries from the other tutorial classes as well as from the other programmes and give immediate feedback to the posted entries they have read. Feedback comments from the readers on the journal entries were listed under the corresponding posted entries so that the other readers could also share their views. The composers of the original journal entries could easily check against their own entries what feedback they have obtained from the readers. New entries either in form of diary journals or in form of feedback were flagged with an icon to facilitate the readers.

EVALUATION OF THE SUCCESS OF THE WEB-BASED ACTIVITY

The achievement of the objectives of the activity using WebCT was evaluated in several ways. Globally, the whole activity was reviewed to see if the students' distributed cognitions and 'person-plus' were enhanced through observation of students' response in class as reported by the respective tutors as well as on the bulletin board. Feedback from tutors on the teaching team and students were obtained through interviews. The specific improvement of students' writing skills was looked into through verbal feedback from tutors and students.

From tutors' reported observation of students' discussion in working out a reasonable schedule for collaboration, students' interaction in negotiating for the most reasonable scheme was both natural and enthusiastic since it was in everybody's interest to work out a schedule acceptable to all. In a subsequent session when students walked around the class to give comments and suggestions to each other, they were also reported to be very spontaneous in giving encouraging comments to each other, demonstrating much interaction between the writers and the readers. There was sufficient demonstration of their development of distributed cognitions and person-plus in these pre-web forum activities generated. However, similar to what Light and Light (1993: 171) reported in their study of skywriting in University of Southampton, students were rarely critical of each other's work.

In terms of feedback on journal entries in the bulletin on WebCT from both students and tutors, the response, particularly in the first five to six weeks, could be said to be enthusiastic. However, enthusiasm in writing feedback tailed off towards the end of the semester, as the novelty began to wear off and deadlines for other assignments came in a crunch. The feedback to the posted journal entries given in the bulletin board was also mostly encouraging remarks or sharing of similar ideas or experience.

When asked why their comments and feedback concentrated mainly on sharing of ideas, experience and encouragement rather than critical comments on how their peer writers could improve their writing, the majority of the students said that they didn't want to "hurt the others' feelings" or "hurt the friendship". Another possible reason that the tutors guessed was that the students didn't want to receive critical comments from their fellow classmates. They tended to take critical comments from their fellow classmates rather personally and they were afraid that their critical comments might be reciprocated. Furthermore, many students felt that critical comments should best be given by the tutor or a person with authority. A student said that she felt students could learn better from encouragement and praises rather than criticisms. She cited her sense of failure in the past developed from the criticisms she and her classmates received in her secondary school days as an example. That was the reason why she had been giving positive and encouraging feedback to her fellow classmates as well as to the journal writers from the other classes.

The tutors found the discussions generated both in class before and after the students' writing and on the web to be very engaging, spontaneous and interactive. Students interviewed also reported to have developed an interest in reading journals and comments posted on the web by other classes and giving their feedback to some of them, a form of interaction which students could not have without this feature of WebCT. They were also interested to find out how well the other students could write and what range of topics they could write on. Many of the students felt that they could learn from each other not only writing skills, but also some of the subject matter and experience cited.

Tutors who taught the same course last year also reported better quality writing in the journals as students were aware of the wider readership of their writing. A number of tutors have given encouraging comments to students' journals from students of the other classes on the bulletin board, which gave much incentive for students to check up the bulletin board regularly.

All in all, the global and specific purposes and objectives in the design of the activity can be said to have been achieved quite successfully. It was considered a very useful learning experience to the course designer, tutors and the students. However, like what Fetterman (1998) points out, extending the discussion "can lead to endless dialogue" (28). Even though they found the activity to be useful and rewarding, they all felt that they had spent a tremendous (perhaps a disproportionate) amount of time on it.

IMPLICATIONS FOR FUTURE DEVELOPMENT

From the case study on the use of the web in the development of a writing exercise in a conventional university setting, we can see that IT can be used to promote and develop interaction among students. Instead of using IT just for course material presentation and course management purposes, which are very much teacher-centred and unidirectional, IT could be used profitably for interactive, collaborative activities in form of a discussion forum. Through exploring and exploiting such features of IT, not only can the students' distributed cognitions and person-plus be further developed, but their interactive and interpersonal skills as well as writing skills can also be enhanced. Language teachers should no longer dismiss IT as incompatible with interactive language teaching and learning , but instead, should take an active role in exploring its strengths to enhance the effectiveness of teaching and learning.

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THE EFFECTIVENESS OF USING TECHNOLOGY TO TEACH ENGLISH AS A SECOND LANGUAGE

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Index: Technology, Learning English, Web

Abstract: This study focuses on the effectiveness of using technology such as e-mail and websites in teaching and learning English. Around 50 in-depth interviews were made with teachers and students in the College to examine the effectiveness of using technology, such as e-mail, websites as teaching tools. Through such analysis, we can develop a better understanding on the students' and teachers' perception of their language abilities and effectiveness of using e-mail and websites for teaching. If there is a wide discrepancy between teachers and students' perception, it is better to equip our teachers with better understanding of the students' problems when using such technology.

INTRODUCTION

Developing an effective curriculum has always been a major concern of teachers. Changing technology has changed the nature of many jobs including the ways of teaching. Teachers need to keep up with the latest development in communication technology. However, new technology alone does not make teaching operate smoothly and learning effectively. It is essential for us to decide which technological tools we will use to enhance the teaching process and effectiveness.

In Hong Kong, the College of Higher Vocational Studies of the City University of Hong Kong particularly aims to provide programs to meet the needs of students, their future employers and the community of Hong Kong. Teaching quality is particularly emphasized in the College. Business and industry are beginning to acknowledge the benefits of language skills and seeking to employ people having them. Better specification of vocational needs is needed. In addition, more language resources should be made available for teaching languages. With the fast development of advanced technology, such as Internet, e-mail etc., it is inevitably important for teachers to use technology as one of the delivery modes of teaching (Cox, 2000.) This paper is to examine the value of using technology in terms of delivery mode in teaching English as a Second language. Finally, suggestions will be made on how to optimize the use of technology for teaching English as a Second Language.

LITERATURE REVIEW

"Learning is seen to occur by making sense of knowledge one is exposed to and with which one interests by way of mental processes and interaction with other people" (Pachler,1999, p.7). For behaviourist ideas, learning is broken down into a sequential series of steps, each covering a piece of subject domain. Computer is essential for modeling the role of tutors offering some input or information that the learner can "drill and practise" followed by provision of feedback. As mentioned by Warcheur (1996), repeated exposure to the same material is beneficial or even essential for learning. Internet can provide huge amount of information, which can serve as a very good modeling role for students to learn English. For students with low proficiency, they can also refer to the computer program repeatedly for more controlled and guided practices.

Cognitive theory of learning sees the learner no longer as passive recipient but as mentally active participant in the learning process. As such, the learning of brains in terms of rules and models of information intake, storage and processing is emphasized. As teachers, we need o present the students' required skills in ways that meet the varied learning needs and learning styles of students. Using technology can make a significant contribution to this process because information can be packaged in a variety of contexts and styles.

It is also a prevailing view that is beneficial for teachers to be aware of students' preferences of their learning environment (Pachler,1999). According to (Ellis, 1994), students can be categorised into four learning styles, concrete learning style, analytical style, communicative learning style and authority style.

General learning Styles	**Main characteristics**
1. Concrete learning style	Direct means of processing information; people oriented, spontaneous; imaginative; emotional; dislikes routinized learning; prefers kinesthetic modality.
2. Analytical learning style	Focus on specific problems and proceeds by means of hypothetical-deductive reasoning;object-oriented; independent; dislikes failure; prefers logical, didactic presentation.
3. Communicative learning style	Fairly independent; highly adaptable and flexible, responsive to facts that do not fit; prefers social learning and a communicative approach; enjoys taking decisions.
4. Authority-oriented learning style	reliant on other people; needs teacher's directions and explanations; likes a structured learning environment; intolerant of facts that do not fit; prefers a sequential progression; dislikes discovery learning.

Source: Ellis (1994) p.506

Certainly, there is still uncertainty over which learning style works best, this aspect of cognitive psychology is of relevance for teaching in general and the use of technology in particular (Pachler, 1999). It is advisable for teachers to be aware of the variety of preferences among students about the learning styles. Teaching approaches and methods need to be varied. New technologies only offer one of the many possibilities to provide varied learning opportunities. Thus, it is essential for teachers to collect feedback from students and teachers regarding their perception of the preferred modes of learning in order to create an appropriate learning environment for the students.

METHODS

Procedures

Around 50 interviews from students and teachers were conducted to collect the feedback on the effectiveness of using technology such as website, email, discussion board, and PowerPoint presentation for learning language. A summary of the data was collated in Table 1 and 2.

Table 1

Comments from students	**Frequency**
Website	
Very user friendly and easy to use	36 (90%)
Very useful for collecting data for writing papers and presentation	38 (95%)
Could improve reading skills by reading the information from relevant websites and also samples of documents	32 (80%)
Too much information, have difficulty in selecting the relevant information	14(35%)
Time consuming	10 (25%)
E-mail	
Good for communication	35 (88%)
Quite a lot of technical problems	5 (13%)
Could save time and money when submitting assignments	38 (95%)
Never read e-mail messages	2 (5%)
Discussion Board	
Interesting and could get feedback from teachers and students	4(10%)
Have difficulty in giving comments to other students' work	15 (38%)
No time to take part in the discussion	34 (85%)
Downloading notes or materials from websites	
Too expensive	25 (63%)
Could provide more flexibility to the students	30 (75%)
Too slow	35 (88%)

Table 2

Comments from teachers	**Frequency**
Websites	
Good for retrieving data and information	9 (90%)
May not be able to guarantee quality work	5(50%)
Should provide more guidelines on the selection of materials from websites	8 (80%)
Teachers need to be more aware of the learning goals and learning styles of the students when using technology as a delivery mode	9 (90%)
Ethical problem	2(20%)
e-mail	
Good for communication, speed up the communication process	10 (10%)
Time consuming to give feedback to students' messages or assignments	7 (70%)
Downloading notes from websites	
Visual impact on students- raise motivation	6 (60%)
Technical problem when uploading the materials on website	5(50%)
Could provide more flexibility for students	7 (70%)
Save time and money	7(70%)

Websites

Around 90% of students and teachers agreed that websites were very user friendly and provided a lot of information for learning and acquisition of skills. In particular it was a very good tool for providing samples and information package. Most students made use of internet to collect information, materials and sample work. It was rather difficult for some students to find the appropriate websites, for example, one student pointed out that she had great problem in finding a website on which she needed to make comments as an assignment. One student also pointed out that she spent a lot of time in searching the appropriate materials for her project because she could not enter the right key words. Four students indicated that they could not make use of internet to collect information regarding the current controversial issues. A few students mentioned that they had difficulty in surfing the internet because they were not very familiar with the availability of the websites.

e-mail

Students favoured email communication very much because it was very user-friendly and convenient. They would be very frustrated if teachers never sent them feedback. Some students responded that submitting assignments through e-mail could save money and time for them. Even so, around 10 % of the students never read email messages.

Teachers found e-mail a very convenient channel for communication. However, sometimes there would be email jam and virus problems if there were too many email messages. It was quite time consuming to retrieve assignments and reply email messages every day.

Discussion Board

A few students (only 10% or even 5% for some of the courses) responded to the discussion board. Around 80% students found it time consuming and those who had participated in the discussion board usually found this activity interesting and worth doing. They could make improvement from the feedback of the tutors and peers regarding the content and style of the assignments. For peer discussions, students needed encouragement for giving comments on others' essays. Ten students said they did not know how to give comments.

Teachers generally favoured a more interactive approach for web teaching. It was sometimes time consuming to give feedback to students but students' work could be improved a lot if they actively took part in the discussions. Teachers should monitor the progress and encouraged the students to participate. More importantly, the design of the activity should tie in with the learning goals and learning styles of the students.

Downloading handouts, notes from website

Most students found it convenient to download materials from websites but some of them commented that the process was too slow. Some responded that it was rather expensive and time consuming to download materials. It would be good to use the materials as references. Some teachers did not favour the idea of uploading the handouts on the websites because students would tend to be absent from classes if they found all the materials on the websites. The outline of the lectures could be uploaded for students to browse before they attended the lecture. It could be money saving and time saving to upload the materials on the website from which students could have more autonomy for learning.

Others

Most students found that Power Point presentation could be very boring if the presentation was too long (for example, more than 20 minutes) but using Power Point for short presentation(10 minutes) was very advisable. It was rather surprising that a few year one students were not very familiar with the use of computer. They found it very confusing to use software even Microsoftword for typing. They had a lot of problems with the use of internet. One teacher found that it was time consuming to use high technology for teaching and this teacher tended to withdraw from using it and did not find it a very effective teaching tool either.

SUGGESTIONS

Learning is a part of our life. The term "learning" denotes a broad range of activities and process, which could be regarded as a cooperative interpersonal communication process between persons that mutually play different roles. An increasing portion of the human effort is devoted to the challenge of coping with increasing amount of knowledge and with rapidly changing demands for skills required by the business world and the private world. An individual has to find effective ways and means to keep up with these challenges and changing conditions (Muhlhauser,1995). It seems that it is unavoidable for teachers to use technology as one of the delivery modes which can help us keep abreast with the rapidly changing world. Based on the above findings, it is concluded that in order to increase the efficiency of teaching, the following issues should be addressed to create an appropriate learning environment for using technology (Muhlhauser,1995).

Learning goals

Learning styles

Learning reduce instruction time

Increase retention rate

Control the learning process

When using technology, we need to consider the learning goals, the subject and requisite skills, for example, if we emphasize on process writing, tutors' comments may be essential to the learners. The use of email tutoring or discussion board (Coogan, 1998) may be better than sampling documents on the websites. Understanding the learning styles of the students could enhance the learning environment. Students' language needs, learning styles, and computer knowledge should be considered when using the technology for teaching to adapt to learners' preferences and individual learning needs. Increase the retention rate is by raising motivation. Using technology will have a visual impact on students, which can increase their motivation and retention rate. Finally, it is very essential for the teachers to monitor the learning process by using technology. He or she must be aware of when and how to acquire new skills and knowledge.

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WEB-BASED VOCATIONAL ENGLISH: DEVELOPMENT, PRACTICE AND PROBLEMS

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Index: Web-based learning, Vocational English, On-line learning

Abstract: In response to the IT in education initiative by Hong Kong's Vocational Training Council, a project on web-based vocational English course was carried out at the Language Centre of Hong Kong Institute of Vocational Education (Tsing Yi) in September 1999. This project aimed to find out how to enhance language learning through integrating web-based and classroom-based activities. A survey was administered to investigate students' response to this type of learning experience. In this paper, the development of the web-based activities and the integration process would be described and the survey results would be discussed.

INTRODUCTION

Hong Kong Institute of Vocational Education (HKIVE) is the largest institution in Hong Kong to provide vocational training and education under the Vocational Training Council (VTC) of Hong Kong. It is composed of nine campuses in various locations in the territory. Language modules, offered by the Language Centre of each campus, form part of the formal curriculum in all the courses that HKIVE offers.

The Council is committed to using information technology as one of the modes of course delivery. The plan is that over a 5-year period up to 2004, 75% of the curriculum for HKIVE's courses are to be web-based (45% for presentation and 35% interactive). Currently most language modules are classroom-based, supplemented with computer-assisted learning activities. In response to the commitment, the authors in the Language Centre, HKIVE (Tsing Yi), initiated a project to explore the possibilities of integrating web-based materials into a vocational English module.

DEVELOPMENT AND INTEGRATION

The project started in September 1999. A block of four lessons on job application were chosen in the Technical English module for the second year students in the Department of Electrical and Telecommunications Engineering at HKIVE (Tsing Yi). The block consists of four units, namely, Job Advertisement, Resume, Job Application Letter and Job Interview. Web-based learning materials were developed and a website was set up.

There are a few assumptions underpinning the design of the project.

1. ***Involvement***: As cited in Nunan (1991, pp.171), Rubin and Thompson characterise efficient language learners as those who 'make their own opportunities, and find strategies for getting practice in using language inside and outside the classroom; use mnemonics; are creative and experiment with language'. The web-based tasks would provide opportunities to engage the students with language activities outside the classroom. Despite different learners and learning

styles (Cotton, 1995; Tennant, 1988), the depth of participant involvement appears to be essential. The web-based tasks were designed in such a way that the students should become involved in and committed to their own learning.

2. ***Motivation:*** Bork (1992) points out that many studies for years have shown that the amount of quality time spent at a learning task is one of the most important factors in determining how much and how well students learn. People will spend more time learning if they like what they are doing. Apart from the topic being of interest to the students, some kind of incentive could be built into the activities to encourage students to learn.
3. ***Independence:*** To be independent in learning means that the students should be able to manage and monitor their own learning, and decide their pace of learning. Many students find it difficult to cope with tasks in English requiring an independent approach. As a result, they are often confused and passive in the face of the new demands placed upon them and many are unable to achieve the maximum academic performance (Watkins and Biggs, 1996). The delivery of the web-based tasks should enable the students to work independently.
4. ***Integration:*** Since human interaction is essential for language learning, an integration of web-based and classroom-based activities would enhance learning.

The approach adopted in the design of the block was to integrate the web-based tasks with classroom teaching. It is believed that they would complement one another. The arrangement was that students were required to complete the web-based tasks before the lessons. Students were given guidelines on how to use the web-based materials and worksheets to complete in addition to the tasks presented in the website. In order to encourage involvement of students, the materials were made as interesting and challenging as possible. Each unit would require about an hour to finish. A quiz, as an incentive to encourage the students to complete the web-based tasks, was given at the beginning of each lesson. Follow-ups on what students had learnt and extended activities were then done in class. This integrated approach takes advantage of what modern technology can offer and more importantly recognizes the specific nature of language learning, that is, human interaction as an essential part of the learning process. The block was delivered in February 2000 over a period of four weeks.

THE SURVEY

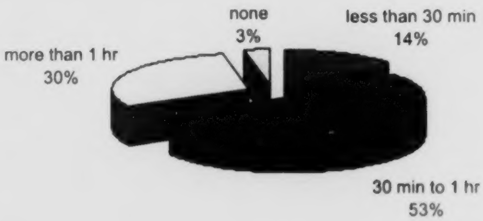
A survey was carried out at the end of the block with a sample of 173 students. They were all year two students studying higher diploma in the Department of Electrical and Telecommunications Engineering at HKIVE (Tsing Yi). The purpose of this study was to investigate the students' response with regard to the assumptions underlying the design of the project as discussed above. A questionnaire was administered to collect data for analysis.

ANALYSIS AND DISCUSSION

Involvement: The tasks in each unit would require about 1 hour to finish. As shown in figure 3, 53% of the students spent 30 minutes to 1 hour on each unit. Quite many (30%) spent more than 1 hour. This reflects that the majority (83%) of the students did spend sufficient time in doing the web-based activities. It shows how much they were involved in the tasks.

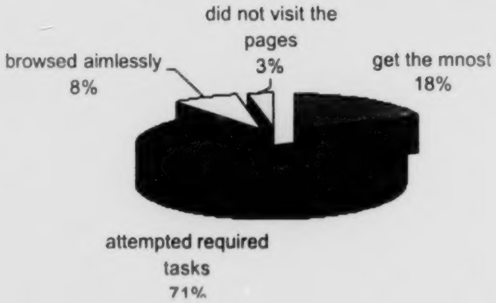
The findings also reveal that some students (17%) spent none or less than 30 minutes on the tasks. Apparently these students were not very much involved in the learning tasks. This may be related to whether these students were willing to take up responsibility and what kind of motivation they may have as discussed next.

Figure 3. How much time did you spend on the web-based activities?



When asked how much effort they paid in doing the tasks, the majority (71%) of the students expressed that they just attempted the required tasks as told (figure 4). This reflects that these students took up only minimal responsibility for their learning, that is, just enough to finish the tasks as assigned.

Figure 4. How much effort have you paid in doing the web-based exercises?

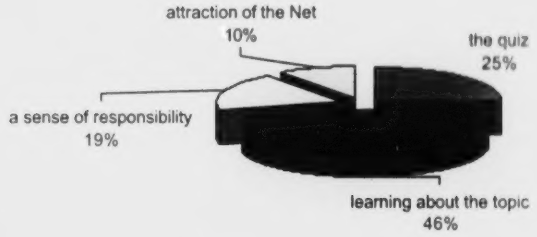


A small number of students (around 10%) indicated that they either browsed through the pages aimlessly or did not visit the website at all. This is consistent with the results in the question discussed above. These students did not take up as much responsibility as necessary to finish the web-based activities. However, almost one fifth of the students attempted the tasks because they tried to get the most out of the activities.

On the whole, the results show that basically most students (89%) have a positive attitude towards taking up responsibility for their own learning. The web-based activities hand over the responsibility of learning to the students. It is believed that to be more effective and efficient in learning, students should take up more responsibility in their own learning.

Motivation: When the teaching block was first designed, it was felt that job application would be of interest to the students. Also, it was believed that a quiz after each unit can motivate the students to complete the tasks. However, the survey shows that the number of students who did the web-based activities because of the quiz amounts to only a quarter of the total. This did not coincide with the hypothesis that follow-up quiz would be a strong motivation for the students. Rather, "the desire to learn about the topic" was an even more important reason as 46% expressed that that was the most important reason (figure 5). This confirms that the choice of the topic was right. 19% of students completed the tasks out of a sense of responsibility. This matches with the findings from another question on how much effort they have paid in doing the web-based tasks, as discussed above. This may lead to the conclusion that intrinsic motivation (e.g. interest in the topic) would be a stronger drive than extrinsic motivation (i.e. quiz) for students to learn.

Figure 5. The most important reason that has made you do the web-based exercises?

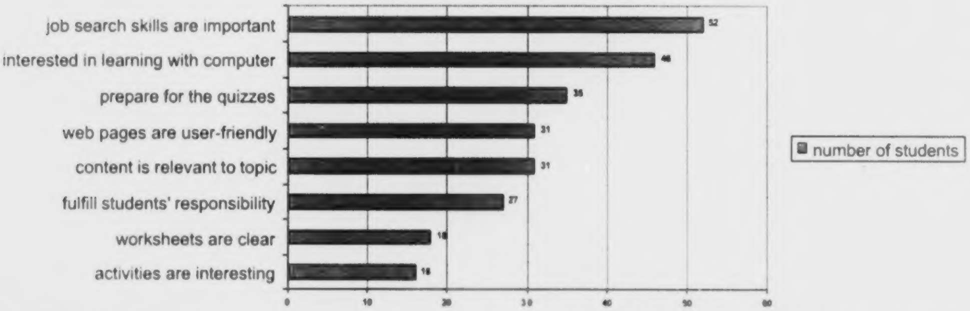


It is not surprising that only 10% responded that they did the tasks because of the attraction of the Net. Having done a survey of available multimedia learning materials, Clark and Craig (1992) concluded that multimedia is not the factor that influences learning. This again confirms that the topic rather than the medium is a more significant motivating factor.

Students were asked the reasons that had made them do well in the tasks and more than one option was allowed from a list. As revealed in figure 6, the reason with the most ticks is that job searching skills are important to them. This further confirms that motivation coming from within the students would have much more influence on students' motivation to learn.

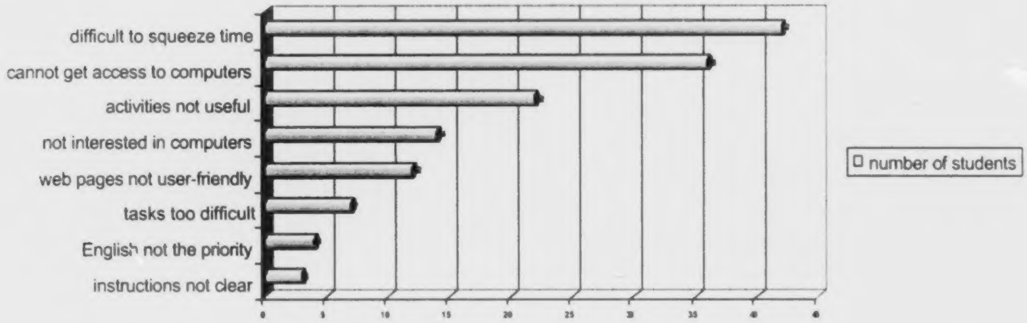
The reason with the second most ticks is their interest in learning through the computer. This seems to be in conflict with the previous question about reason for making them do the web-based activities. This could be explained by the different formats of the two questions. Only one option is available in the former question while in the latter one students can choose more than one. Since the most important reason is related to the significance of the topic itself, only a small percentage goes to the attraction of the Net. Therefore, the results are not contradictory.

Figure 6. Reasons for doing the exercises well



Independence: Students were asked to indicate why they had not done the tasks well. As shown in figure 7, the two most prominent factors are "difficulty to squeeze time" and "cannot get access to computers". Other factors are not as significant. This may reflect the way that the students manage their time, particularly on allocating time for learning. An independent student should be able to take control over his learning. As in this case, the students needed to make arrangement to complete the tasks by themselves, their performance in the tasks would therefore be highly attributed to how they manage their time. If the unit is entirely classroom-based, the time factor is unlikely to be a problem.

Figure 7. Reasons for NOT doing the exercises well

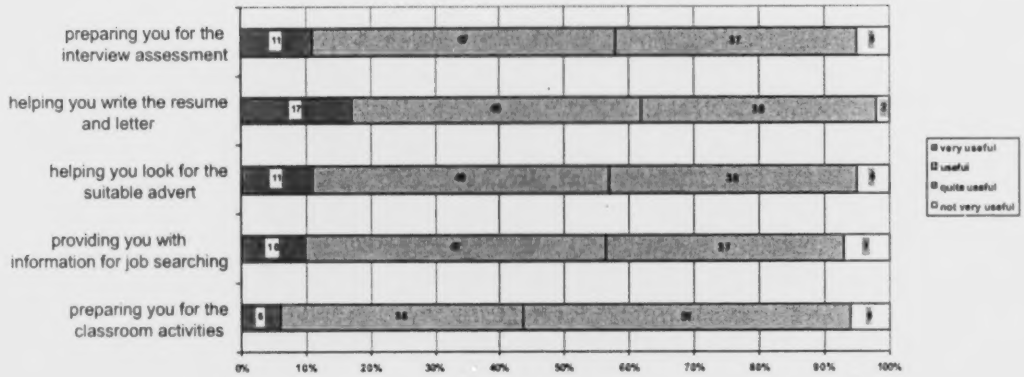


As for the other reason of "cannot get access to computers", this also demands the students to plan ahead. The computer rooms are open for free access throughout the week at different times in the campus. If the students really want to complete the task, they can by planning and reserving time slots well in advance.

Integration: It is believed that a combination of web-based and classroom-based activities would enhance learning. Figure 8 shows what the students thought about the usefulness of the web-based activities.

On average, around 56% of the students thought that the web-based activities were very useful and useful except for the usefulness in "preparing you for the classroom activities". Only very few students thought that the web-based activities are not useful.

Figure 8. How useful are the web-based activities?



CONCLUSIONS

While it is impossible to reach definitive conclusions, a few things are worth noting:

1. Web-based learning would invite more involvement from students. Having to spend one hour or more on the web-based activities has made students more involved in their own learning. As they already got some information from the web-based activities, they were better prepared for the classroom learning and participated more actively in class.
2. Students are more likely to spend time and effort on what they perceive to be important or interesting to them. Intrinsic motivation plays a crucial role in motivating students to learn. If learning is a terrible task, students will keep at it only through the use of external incentives/threats.
3. Multimedia materials presented through the web do not necessarily become motivating for students. Motivation must come from the desire to learn rather than the mode of learning or other external incentives.
4. Web-based learning demands students to be more independent. Unlike classroom-based learning, students need to allocate time to finish the tasks. This was found to be rather difficult for students who have not been trained to learn independently under the current education system. Training should be provided to students to help them develop skills that are required to be independent learners.
5. The integrated approach is perceived to be successful in enhancing learning.

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ESTABLISHING A VIRTUAL BUILDING & CONSTRUCTION SITE FOR EDUCATION AND TRAINING

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Index: Courseware Development; Instructional Technology; Building & Construction.

Abstract: Field trips, site visits and industrial placements can make an important educational contribution by bridging the theory–practice gap through the provision of vital contextual information and the promotion of insights not easily understood in the normal classroom. But, in the Building and Construction industries it is increasingly difficult to arrange actual sites visits. An alternative web site solution is described in this paper. The City University site, the *Virtual Building and Construction Environment*, is part of a much larger group of sites known as *CIVCAL*, developed by four Hong Kong universities. Access is provided to three tours, three building sites, information in a Design Office and Production Office as well as details of some outstanding construction projects in Hong Kong. The paper explains the underlying design methodology and production techniques, including features incorporated to promote learning and comprehension.

INTRODUCTION

There are a number of traditional approaches that provide "real world" experiences in education and training. Particularly in post-secondary settings, the real world is brought to the classroom through such activities as guest speaker presentations, laboratory experiments and video presentations. It could be argued that practice exercises and demonstrations serve the purpose of showing the application or real side of the learning material.

An obvious contrast to providing in-class practical experience is to take students to the 'real world'. Traditionally this is achieved through a range of activities from short-term excursion to longer-term clinical or industrial placements.

Some important factors influencing the educational effectiveness of these activities are organizational logistics, the degree of guidance and supervision, preparedness of participants and follow-up/consolidation. Obviously the participant's focused involvement is vital and preparatory talks and supplementary materials, process observation sheets and report requirements often address this issue.

Field experiences can suffer some disadvantages from uncontrollable influences such as inclement weather, increased travel costs and industrial disputes. Late changes in, for example, the production/construction schedule or safety/security arrangements can cause anything from a minor inconvenience to a complete disaster.

These activities 'in the field' *can* provide exciting contextual learning, prompting insights and sensory experiences that are difficult or even impossible to provide in the normal classroom. The advantages of good actual experiences should not be underestimated and careful consideration should be given before they are entirely removed from the curriculum. This could occur with the overzealous use of immersion Virtual Reality.

The education purpose of such reality enhancing strategies needs consideration. Overall, they provide a means to bridge theory and practice and facilitate contextual learning. Contextualised experiences encourage meaningful learning and transfer of knowledge to both problem–solving situations and real-world events. Also, the provision of multiple stimuli can arouse interest and focus attention. In particular, rich visual environment can promote pattern recognition enhancing memory and recall. This contrasts with many areas of instruction that depend on learning of lists out of context (i.e. meaningless learning).

Other "teaching strategies" aimed at enhancing reality in the classroom include various combinations of role-playing, simulation and educational games. Different media types or technologies are frequently used to support such strategies. Computer and communication technology has played an increasing role in these strategies over the past 30 years. So much so that for example, some science, manufacturing and commerce activities "in the classroom" (i.e. conducted in a "formal course") are actually part of a real-world event. This paper describes how the preceding ideas were taken into consideration and applied to creating a web site in an area of applied science.

The project described is part of a larger project, known as CIVCAL that provides a comprehensive teaching/learning environment for students in many aspects of civil engineering. CIVCAL is an inter-institutional project between four Hong Kong universities: University of Hong Kong (Coordinator), Hong Kong Polytechnic University, Hong Kong University of Science & Technology and City University of Hong Kong. The project is now in its final stage having been developed over 2 years.

A more detailed account of the conceptual and theoretical underpinnings of the web design and the anticipated cognitive outcomes is enunciated in a forthcoming paper by the authors (Wilkins and Barrett, 2000).

NEEDS AND DESIGN CONCEPT

The project evolved out of a need to provide civil engineering students in Hong Kong with current, interesting and appropriate information about local construction projects. The aim was to provide multimedia materials relating to some of the larger construction projects.

The initial proposal for delivery was a multimedia form of encyclopedia on CD-ROM. After analysis and discussion the educational concept was extended and the ideas of a 'virtual site visit' became the design metaphor. Following submission of a joint proposal, the University Grants Committee duly funded the project.

The original idea of concentrating on one or two large sites (the Chak Lap Kok airport project and/or the Hong Kong Convention & Exhibition Centre) was modified after curriculum and resource considerations. Each university concentrated on their area of specialism and following agreed guidelines, set about producing the learning materials.

Due to advances in technology, it was later agreed that the project would be web-based and that CD-ROM would be produced as a secondary form of delivery. This decision facilitated access and lowered distribution arrangements and costs. It also had technical and production implications, for instance, the nature and quality of video that could be delivered over existing and predicted networks had to be taken into account.

The sub-set site developed at CityU is known as the "*Virtual Building and Construction Environment*". It followed the 'virtual site visit' metaphor and is specifically designed to support teaching/learning in building and construction technology. Our approach which is described in this paper and viewable on the website was the creation of multimedia displays and interactive activities in relation to construction processes of actual buildings in Hong Kong.

DEVELOPMENT

This section briefly describes the development process through the design, production and trial phases.

The 'virtual visit' metaphor provided a referential framework for content and assisted navigation and interface design. In this sub-project we focused considerable effort on capturing content. Knowledge engineering methods were used to identify and organize content. A series of work-group meetings concentrated on such teaching aspects as curriculum demands, overlap and gaps between courses and expected outcomes of the student learning experience. The practical, "reality", aspects were also considered including what kind of site visits should be included and what aspects of construction are important.

Faculty expressed many differing views while invited students made a significant contribution. But, to identify the core ideas and underlying structure of content, the Concept Mapping methodology was introduced. This technique of diagrammatically representing content by showing concrete and abstract concepts and their relationships proved invaluable in 'pinning down' a diversity of ideas (concepts) and their relative importance as expressed in terms of their contribution to a users (students) understanding of the content. Results of this process contrast with traditional topics–based structure or that based on how a lecturer may have learnt the material. The resulting map of the domain of building and constructions enabled selection of core clusters of concepts and prioritising these for development.

The above activity is part of the team–based approach to development employed at CityU (Barrett, 1999). In this model, content experts work with technical and instructional designers to produce the pre-production materials. Outcomes include the concept maps, conceptual diagrams, flow-charts, content scripts, screen designs and storyboards. A prototype was produced firstly using a commercial presentation outliner and then as a 'Powerpoint' model which enabled the overall design to be reviewed for functionality and navigation.

These design and prototype exercises provided clarifications of the key components and give directions as to how they would to be produced. It was decided that content could be grouped to show Low Rise, Medium Rise and High Rise housing in Hong Kong, highlighting the techniques applicable both across and unique to each group. Exemplars of each group were identified as respectively the Academic Exchange Building (AEB) on CityU campus and the Harmony and Concord buildings of the Hong Kong Housing Authority. The materials structured under these three areas, (and related icons) were designated the "site visit" within the Virtual Building and Construction Environment.

To further interest, contextualise and consolidate information, three time-based presentation were made. These are designated as the "Site Tours". The AEB consists of a condensed video time-line of the construction with voice-over explanations (i.e. through a virtual tour guide). The second demonstrates and explains the construction of a Harmony Block while the very latest technology is shown using stop-action photography for the Concord Block.

Two other 'virtual buildings' house relevant core content in the Design Office and Production Office. Material is interrelated throughout the virtual environment and additional links allow further exploration.

To enable expansion, a special link to Other Projects is produced in order to add new concepts and recent examples of innovative Building and Construction technology.

One member of the team has produced an extension photographic and descriptive review of recent outstanding projects in Hong Kong (Wong, 1998). Through arrangement with the publisher, this material has to be edited to appear on this site. Gathering and editing content and preparing media elements was a demanding task carried out by content specialists with the work of a research assistant. Pre-production activity of locating, sorting and editing of text and other media requires considerable time and dedication.

PRODUCTION

The Courseware Development Laboratory (CDL) is a dedicated facility for producing educational and training materials on CD-ROM or Websites. It houses all needed facilities and is staffed by qualified and experience personnel in order to provide programming/authoring, graphic art/animation and project design and management. Specialists in the (CDL) carry out web authoring and graphic production.

Again, within the team-based model, individuals work as a node within a specialist network of co-coordinated activity. Work-group sessions, including review activities, keep the need for reworking to a minimum. The outcome is a consistent look and feel and ease of navigation. These aspects will become evident in visiting the web-site http://civcal.media.hku.hk/.

INITIAL EVALUATION

Preliminary tests with undergraduate students of the Building & Construction Department have shown that students find the web site useful in enhancing their understanding of the concepts and techniques relating to the on-site assembly of buildings. Two tests have been run with two groups of students based on evaluation by questionnaire:

Group 1, studying construction engineering and management, evaluated the site one year ago at a very early stage in its development. This group had already been studying construction technology and engineering subjects for almost two years. The group, and its tutor, a civil engineer and full-time member of the academic staff, found the site extremely helpful in providing an overview of the construction process, even at this early stage in development:

Group 2 (over 100 students), was studying in a common first year and would eventually concentrate on construction engineering and management, quantity surveying, or building surveying. The group was first introduced to the web site by the authors and members of the CDL team during a course in Construction Communication. The site was subsequently used by one of the co-authors to teach aspects of building construction technology. Specifically it was used as a "virtual site visit" after a series of lectures and tutorials in technology subjects relating to individual components and building elements - substructure, wall construction, floor construction, roof construction, windows, and doors. An assignment was subsequently set requiring students to respond through the web site to questions posed relating to various production processes. Eventually a questionnaire evaluation was conducted to obtain feedback relating to the students' overall experience of the web site. Again there was unanimous agreement that it provided a useful learning experience, specifically in that it enabled students to integrate the individual building elements and components studied in the previous lectures and tutorials. The site visit concept was well liked and the video, time lapse and animation sequences appeared to be particularly helpful in viewing overall construction processes, which could then be examined through more detailed visual and text material on the web site.

A comprehensive student evaluation will be conducted in the first semester of the 2000/2001 university teaching year.

SUMMARY

Practical, "work experience" activities have the advantage of contextual learning fostering integration of knowledge and promoting affective awareness. Under well-organized and well-supervised conditions, different forms of site visits have much to offer. But interruptions, interference and conflicts in purpose often diminish the learning experience to the extent of making it unproductive.

Reality enhancing procedures such as simulation, gaming and role-playing have often been added to the traditional mixture of lab experiments and projects. In addition, computer simulated environments of various kinds can be introduced to promote interest, application and transferability of knowledge for the purpose of bridging theory and practice. Taking these ideas into account, we have designed and produced a web-based environment founded on knowledge engineering techniques and employing multimedia and communication technology.

We have attempted to employ the most efficient means of development through team-based networking. Specialists using the appropriate tools in suitable facilities carry out actual production.

Also, as this material has broad delivery, only limited by web access, it is suitable for distance learning, vocational and professional continuing education. In addition, the general model could easily by extended to provide on-the-job training or act as a Decision Support System.

The content organisation and associated functionality underlying this project is in direct contrast with the random collections, or even topic-based collations, of materials frequently encountered in web course materials. Moreover, what is not immediately evident is that users (students) are exploring the information provided according a highly designed representation of declarative knowledge. This emphasizes the building of 'conceptual structures' of the knowledge base. Also, users view the material in context and sequentially (through time-based sequences in the virtual tours) which promotes development of procedural knowledge. These processes foster schema formation and consolidate understanding. The project has also makes extensive use of multimedia elements not for "entertainment" but to promote student learning through multi-sensory perception and pattern matching processes.

Developing good quality learning materials is demanding and resource consuming. It is important then, that the educational purpose, learning experience and outcomes be paramount in producing web-based educational materials. Application of design principles from Instruction and Cognitive Science is imperative if the learning experience is to become more effective. Production and implementation raise important issues relating to efficiency. The web site described in this paper, while still having room for expansion in terms of content and learning activities, demonstrates one collaborative effort that provides students with relevant, accessible and thought provoking materials.

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THE WEBVOLUTION'S IMPACT ON VOCATIONAL CLASSROOMS AND ADMINISTRATION

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Index: Internet/WWW, IT Costs, ASP, Communications, Security, Connectivity

Abstract: We are eyewitnesses of a Webvolution; a revolution brought about by the explosion of the Internet and the World Wide Web (WWW). Few innovations have been embraced more quickly than the Internet. The current trend of the Internet will change the face of education, as we know it. Almost every public school in the United States has Internet access and other countries are adopting these technologies at a rapid pace. The Internet is perhaps the first truly global environment. This paper will explore the potential of utilizing the WWW as a resource for vocational classrooms and administration. It provides informative information on such topics as: (1) true cost of information technology ownership; (2) using an Application Service Provider (ASP); (3) using the Internet as a communication tool; (4) data security issues; and (5) fundamental changes in the infrastructure requirements of information technology.

INTRODUCTION

Leaders all over the world realize that the most precious natural resource of any country is its children and that technology is key to education [10]. The Internet and the WWW are ubiquitous. In the United State alone, educational institutions are spending billions of dollars on technology in an effort to improve learning and increase productivity. Nearly every public school in America (95%) now has access to the Internet, and the goal is to have every school and classroom connected to the Internet by the end of the year 2000 [17]. Schools all over the world are receiving assistance from a number of organizations and programs in an effort to get "connected". For example, The World Links for Development (WorLD) program has shipped hundreds of computers, resulting from an internal upgrade, to many universities in Africa [5]. Their goal is to have full Internet access to each of the sites. The "Singapore ONE (One Network for Everyone) initiative" plans to develop a nationwide broadband network that will link homes and schools [15]. The WWW is an incredibly vast resource for stakeholders involved in the education progress.

The remainder of this paper presents a framework for discussing the impact the Webvolution can have on vocational education as it relates to classroom management and administration management. It will examine the total cost of ownership (TCO) of information technology. The paper will examine current trends of outsourcing with application service providers (ASPs) in a hosted environment as a means of deploying software applications. It will explore the potential of utilizing the WWW as a resource for "real-time" collecting, organizing, analyzing, and communicating information. Subsequently, the paper will examine security issues as they relate to storing information. In addition, it will examine the impact the WWW and web appliances could have on reducing infrastructure requirements thereby making computer technology available to a greater number of educational institutions worldwide.

Total Cost of Ownership

"Beliefs about total cost of ownership are, like religious convictions, intensely held and widely diverse" [Gibson, 20]. Kirwin defines TCO as, "…a holistic view of cost related to information technology acquisition and usage at an enterprise level" [qtd. in Gibson, 20]. Quantifying IT costs and benefits is very difficult if not impossible. Some costs are obvious such as the initial price of hardware and software. However, Gartner Group Inc., [cited in Gibson, 1997] has long contended that other costs such as upgrading, training, maintenance, and technical support are many times the PC's initial purchase price. It is estimated that TCO for a PC on a local area network costs somewhere between US$9,000 and US$12,000 per user per year [4]. Information technology should be seen as cost effective; however, if technology is taken down the wrong path, it could prove to be very costly. TCO is a legitimate concern that must be constantly evaluated. Schools should be looking to web-based applications as a means of reducing IT costs.

Outsourcing with ASPs

One of the biggest IT costs for schools is buying prepackaged applications for in-house use; however; this may become a thing of the past. As schools struggle to find new ways to collect, analyze, and share information and reduce IT costs, one revolutionary approach is to use what is known as an application service provider (ASP). The ASP market represents a fundamental paradigm shift from the traditional ownership of software licensing and services to outsourcing. An ASP is an independent, third party provider of software-based services, which are deployed to customers across a wide area network [1].

ASPs can prove to be cost effective because the school needs no in-house application servers or database servers to support the applications. Rather, ASPs provide services to implement, host, and maintain application software and IT services in a hosted environment. Web browsers provide a standard way to interact with an ASP system and neither the Internet nor browsers add much cost to the outsourcing equation. Other not so obvious IT costs include maintenance and support. ASPs have the potential to simplify these issues according to advocates of the approach. Boyd [cited in Bushweller, 2000]) contends that regularly updating information requires information technology expertise that schools don't have. According to Boyd, this is especially the case in small to medium-sized districts that can't afford to hire teams of information technology specialist. ASPs can relieve customers' installation and system-support hassles and give customers browser-based web access. McKie [9] contends that outsourcing with an ASP is certain to be part of the future of every organization in the Internet age.

Virtual Communication

"The most important information we have to communicate to parents is about their own children" [Reid, A24]. While research shows that student learning is maximized through parental involvement [20], keeping parents informed takes valuable time and resources. In an effort to address this problem, many U.S. State legislatures are mandating that schools embrace the power of technology to bridge the communication gap. For example, under Utah's 1999 Digital State law, schools must make "reasonable progress" toward making student information available via the Internet by July 1, 2002 [19].

The real value of the Internet is not in its ability to reduce costs or infrastructure requirements but in its ability to make the data available to the appropriate parties at the most opportune time. The information must be easily accessible to authorized users, and with the help of web-based services, school administrators and teachers have the ability to make pertinent school information readily available to governing bodies, parents, and students. As access to the Internet becomes more universal, parents can assess their children's current progress on their own web devices. For example, one of the most fundamental types of school-to-home communication is the report card. Producing a report card in the traditional manner can be very disruptive to the instructional process. However, if schools were to apply the concept of "anywhere, anytime" reporting to the grade report system, parents and students could produce a progress report on demand without intruding on the learning process.

More and more software programs are utilizing the Internet as a communication tool. For example, Excelsior Software and National Computer Systems Inc., both promote using the web as a tool for connecting school and home. However, many schools are prohibited from using many of the products on the market due to the costs involved. FreefromIT.com, an ASP, provides a solution that any district can afford. They have developed a "free" web-based classroom management system (http://www.classroll.com). The company is unique in that it can offer its product at no cost to schools because it generates revenue by advertising banners on its website. Because the programs and the student data are stored and hosted by Classroll.com for free, the only thing that is needed to access the product is a web browser. Most experts think it's not a question of whether schools will be communicating with parents via the Internet, but where and when. Companies such as these will play a crucial role in helping schools move to the new era of "anywhere, anytime" computing.

Data Security

On May 3, 1999, a devastating tornado ripped through Oklahoma killing people, destroying businesses and schools, and literally wiped towns off the map. While most school see the necessity of securing computer equipment against such disasters, they fail to protect their most valuable asset; information. Computers cost money and therefore should be considered a valuable asset. However, when districts take a moment to consider why they are so willing to invest large amounts of money on computer equipment—to store, access, and transmit information—the value of that information becomes more obvious. In the education community, information about students, staff, and other resources is far more valuable than the most costly equipment. There are countless examples of how data can be destroyed; theft, vandalism, and hacking, just to name a few. Sharing data via computers and networks has proven time and time again to be a cost-effective way of getting things done; however, inappropriate access using this type of technology has emerged as one of today's highest-profile data security issues [18].

The safeguard to the destruction of data is to keep a copy of the data in a different location, known in the technological world as "off-site" back-ups. Technology makes it affordable and relatively simple; however, far too many of those responsible for the off-site back-up fail to see its significance. It would only take one catastrophe like the example given above to realize the significance of an off-site back-up. Safeguarding data from inappropriate access requires constant monitoring and a tremendous amount of technological expertise. The idea of outsourcing with an ASP rather than having the data stored on an in-house system is a security concern for many schools. However, Stacy Boyd, president and CEO of Project ACHIEVE, a San Francisco based ASP and former middle school principal, [cited in Bushweller, 2000] contends that information is no less secure at an ASP site that it is in-house. Outsourcing with an ASP is one way of ensuring that your data is secure. After all, safeguarding is their business, educating is ours.

Connectivity

Access to computers and the Internet and the ability to effectively use this technology are becoming increasingly important for full participation in a global society. The Internet has made great strides in eliminating the issue of distance and geography. As of March 1999, it was estimated there were more than 200 countries connected to the web [7]. The art of estimating how many individuals are online, throughout the world, is an inexact one at best; however, it is estimated that 304.33 million people were online as of March 2000 [11]. The following table shows the estimated global distribution by region.

Table 1
Estimated Number of People On-Line

Region	**Number (millions)**	**Percentage**
Total "On-Line" World	304.33	
Africa	2.58	0.85%
Asia/Pacific	68.9	22.64%
Europe	83.35	27.39%
Middle East	1.9	0.62%
Canada & USA	136.86	44.97%
South America	10.74	3.53%

Source:NUA Internet Surveys
http://www.nua.ie/surveys/how_many_online/index.html

It is estimated that sixty-six percent of U.S. households will be online by 2003 and seventeen percent of Western European consumers are expected to be online by the end of 2002 [13]. While this may sound impressive, it must be put in perspective. We share the same world and we share the same challenges. While the web is reaching an increasing number of people worldwide, we remain a "disconnected" world.

In the new information age, the majority of the people in the world do not have access to the most basic telecommunications infrastructures and its benefits. There are approximately six billion people in the world spread out over a billion households. Fewer than two percent of the world's population have access to the Internet [14]. More than half of those households do not have a telephone, much less electricity to plug in a computer [3]. For example, sixty-five percent of schools in Mexico do not have telephone access [8]. Where there is limited access to telecommunications, access to education is likewise limited. Unless the infrastructure is in place, those in most need of an education will continue to be at a disadvantage. While wireless technology is in its infancy, it and the ASP model may very well be the solution in ensuring that there is equal access to technology in schools around the world.

Currently, the PC is the primary tool with which to access the information Internet; however, that doesn't mean is the best way [21]. An alternative to standard landlines, wireless technology is becoming the communication method of choice for developing and industrialized countries around the world [16]. Wireless web devices such as the advanced cellular telephones with Internet browser capabilities is one such alternative to standard landlines. Qualcomm Inc, the developer of CDMA digital wireless technology, has developed a wireless local loop phone targeted toward countries with developing communication requirements that are currently without telephone service [6]. Using this type of wireless technology, telephone infrastructure can be implemented more quickly and at a lower cost than traditional landline service. Hosted applications provided by an ASP promise not only to reduce costs but because they can be located anywhere in the world, they can also reduce some of the local infrastructure requirements. Wireless technology, ASPs in a hosted environment, and web devices can be the solution in bridging the gap between the "haves" and "have-nots". Vocational Educators are often viewed as the leaders in technology. The

Webvolution is an opportunity for us to take the lead in discovering how we can we can use this technology to enhance the educational process.

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AUDIO AND VIDEO DEVELOPMENT FOR MULTIMEDIA AND WEB-BASED APPLICATIONS

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Index: Multimedia, Internet, Pedagogy, Curriculum Development

Abstract: Technology allows vocational education teachers to increase their delivery modes in the computer environment—from basically text-based to audio and video inclusion. In this session, appropriate video and audio usage, online audio and video sources, audio and video development options, and integration of audio and video into teaching tools will be emphasized. Available research on audio and video inclusion will be shared.

INTRODUCTION

Instructional technology continues to grow and evolve. Because of its increased use, more interest has been placed in its appropriate integration into teaching and learning. The longest-running effort of technology integration in schools is Apple's Classrooms of Tomorrow (ACOT) project. In these technology-rich schools, students work more collaboratively than in traditional classrooms (Newby, Stepich, Lehman, & Russell, 2000). They are comfortable with technology and use it to find information, analyze the information, and present their findings. In the ACOT classrooms, teaching and learning has been transformed with instructional technology as the catalyst.

The developments in computer power support the use of more and more sophisticated media in the instructional technology environment. In the near future, it will be common place to support audio and full-screen, full-motion video along with text and pictures. Web-sites, which are rich sources of information for both students and teachers, will become increasingly more interactive. Streaming audio and video (audio and video sent out per request over the Internet) will improve and open new opportunities for teaching and learning. In the future, education will be enabled by instructional technology.

Audio and video in the computer environment is a powerful way to capture students' enthusiasm for learning, energize teaching, and extend the educational community. Audio via the computer provides an additional medium for explaining a concept or idea. Computer video brings learning to life, builds bridges to higher-order thinking, provides visual examples, and brings people together.

This paper shows appropriate computer video and audio usage, online audio and video sources, audio and video development options, and directions for integration of audio and video into teaching tools use will be emphasized.

COMPUTER VIDEO AND AUDIO USAGE

Developing and using computer video and audio is "fun" but teachers must resist using these technology tools only because it is novel or because "everyone else is doing it." Technology merely provides educators with the tools for authentic learning (Schrum, 2000). There are a variety of reasons why teachers should consider using video and audio in the computer environment:

- Current information can be brought into the classroom.
- Case studies come alive.
- Difficult concepts can be explained.
- Special activities can be archived and used again (field trips, guest speakers, etc.)
- Student development of audio and video builds critical thinking and team building skills.

The pedagogy of computer audio and video use in the classroom should focus on how this technology lends itself to creativity, exploration, understanding, and documentation of knowledge learned (Schrum, 2000). Students become active versus passive learners, producing knowledge and presenting that knowledge in various formats.

ONLINE AUDIO AND VIDEO SOURCES

Audio and video sources are plentiful on the web but may not be appropriate for educational use. One of the best overall places to go can be found at the Excite website (www.excite.com/search_forms/audio_video_search/). At this web location, a teacher can search for a particular audio or video file format. Any search engine can be used to find audio or video by combining the topic area plus one or more of the audio and/or video formats. The most popular audio and video formats in education are defined below.

Audio

The most common audio formats in education are: WAV, AU, AIFF, SND, MIDI, and RealPlayer (.rm). The file format MP3 is also popular on the Internet but tends to be used for music files. WAV (with file extension of .wav) is a native Microsoft audio format. Because it can be played on a variety of computer platforms, it is one of the most popular types of audio file on bulletin boards and the Internet. The AU format provides a small file size but a poor quality sound, normally only an 8-bit, 8kHz monaural sample. An AIFF file is an Apple (Macintosh) interchange format. It operates in a similar way as a WAV file and can be played on various computers. SND is also a Macintosh format but can only be interpreted by Macintosh computers. MIDIs are electronic music files. The audio file format posed to take over the Internet is RealPlayer. Audio in this format can be played on computers with the RealPlayer plug-in.

Video

The three most popular video file formats are AVI, MOV, and RealPlayer. Window-based computers often use the AVI (Audio Video Interleave) format for digital video but this format can also be read by Macintosh computers. The Apple/Macintosh video development software called QuickTime produces MOV formatted files. QuickTime videos can be produced on either a Macintosh or Wintel machine. QuickTime 5.0, the newest version, seems to be a premier development tool for video, producing small files with outstanding video quality. The RealPlayer video format has become a standard on the Internet. Both basic QuickTime and RealPlayer video development programs can be downloaded free.

Two key considerations need to be remembered in the development of audio or video files. First, what type of computer the files will be played on determines format. Because each format is compressed differently and if small files are needed, formats that have a more aggressive compression process would be a better choice. Secondly, what format you choose depends on the plug-ins your audience has on their computers. A WAV file plays on most computers without downloading additional plug-ins from the Internet. On the other hand, to play a RealPlayer file, the receiver of the file will need to have the appropriate RealPlayer plug-in on their computer.

AUDIO AND VIDEO DEVELOPMENT OPTIONS

To record sound, you need a sound card, a microphone, and a sound-capturing program. Audio can be developed through the sound programs that come with a computer. In a Windows-based computer, Sound Recorder is available; on Macintosh, Sound Manager. These programs have limited editing capabilities. For more sound editing options, programs as SoundEdit and SoundForge are inexpensive. RealPlayer and QuickTime can also be used to develop sound files.

Developing and editing videos for computer use is a more complex process. In general, a video card, approximately 96MB Ram, a "fast" computer, and video capture/editing software are needed. RealPlayer (www.real.com) and QuickTime (www.apple.com/quicktime) have free, limited functioned software available for downloaded for video capturing, editing, and producing. Additional money can be spent to purchase "pro" versions of each programs. Other software products are available for video editing (as Ulead, MGI VideoWave, and Adobe Premiere) but are more complicated and are not necessary for most educational uses. Digital Origin also produces an easy-to-use video editing software.

Audio and video on the Internet can either by played after the file has been downloaded to a computer or immediately after clicking "play". The process of immediate playback of a video without downloading is called streaming. The advantage of streaming is that your audience will not have to wait for the downloaded file and the video clip (or audio) is erased from the computer as it is played. This feature is essential in the distribution of copyrighted materials.

Streaming of audio and video is increasing on the Internet. Three key video streaming companies exist: Real Video, QuickTime, and Microsoft Theater Server. If streaming is the goal, a web server with a large storage capacity is necessary. For example, a three minute movie that is 320 x 240 pixels running at an average frame rate will take up more than 600 MB.

Two other innovations in online video are SMIL and Surestream. SMIL (Synchronized Multimedia Integration Language) allows for the synchronization of a presentation that contains multiple clips or media. A teacher or student can combine pictures, video, and text for a truly interactive presentation. Surestream encodes the video or audio file one time but will play at multiple bandwidths. This capability is important if your audience will be downloading from a variety of "modem" speeds. RealPlayer and QuickTime both provide these innovations. More information about streaming video can be found at www.streamingmediaworld.com/video/tutor.

INTEGRATION OF AUDIO AND VIDEO IN TEACHING

How could audio and video be used in teaching? The most exciting possibilities are online video cases, simulations, and virtual tours. Online video cases are starting to appear in teacher education and technology will soon be common enough for all teachers and students to use. Video case studies allow for the presentation of a problem and engagement of viewers in critical thinking activities about possible solutions to the case. Online cases could also be used to present a student's project from its inception to conclusions and solutions.

Simulations also "tell" a story but provide multiple choices on how to solve the problem. Students view possible scenarios via video or audio segments. Based on their choices, students move throughout the simulation. Video and audio segments provide a more realistic context and allow students to evaluated verbal and nonverbal cues.

Virtual tours solve the problem of not being able to take students to all the great resources in business and industry. As field trips or visits are made, video and audio segments can be taken and then compiled into a "tour" format. Students can then proceed through the tour to gather relevant information.

SUMMARY

According to Jonassen, Peck and Wilson (1999, p. 3), "Knowledge is embedded in activity." In this sense, technology provides a means to embedded knowledge in an interactive way for students. Technology provides a means to explore, motivation to explore, and a way to organize gathered information to gain understanding. The use of audio and video provide a way to increase participation in learning and engage more senses in the learning process. With the improvements in technology, more audio and video via the computer will be used in the teaching and learning process.

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SCHOOL, TAFE AND UNIVERSITY LINKS, IN PURSUIT OF A SEAMLESS PATHWAY

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Index: Partnerships, schools, TAFE, university; seamless educational pathways

Abstract: The Hunter Institute of Technology is the largest supplier of workforce education and training in the Hunter Region of NSW, and one of the largest NSW TAFE Institutes.

One of the Institute's 16 campuses, the Central Coast Campus, is a joint venture of the University of Newcastle, The Hunter Institute of Technology, and the Central Coast Community College. In a number of other locations joint school and TAFE educational precincts are in various stages of development.

The Institute, in partnership with local schools and the University of Newcastle, has an established goal of developing educational pathways, which maximize student articulation and credit transfer. The movement from traditional articulation arrangements to those incorporating the concept of a seamless pathway represents a challenge for these partners.

The Issue Of Seamless Education.

Within the broader operating environment of the Hunter Institute of Technology, the creation of seamless education and seamless educational pathways has emerged over time as policy and planning issues.

These issues are arising in Australia at both the national and state levels, for example:

- An objective of Australia's National Strategy for Vocational and Education and Training 1998 – 2003 is to enhance mobility in the labour market. To this end "Seamless post compulsory pathways will be developed so that students will be able to move freely within the vocational education and training system, and between the system, senior secondary schools and universities." (ANTA, *A Bridge to the Future p3)*
- The Victorian State Government has established a Ministerial Committee on Seamless Education and Training. This committee will develop strategies across all compulsory education and training sectors to remove barriers to achieving a seamless education and training system in order to maximize educational mobility for all Victorians. (OTFE *Learning for Life* p1)
- Dr Ken Boston, Managing Director of TAFE NSW and Director-General of Education and Training has consistently proposed that within his portfolio the different points of focus and emphasis along the continuum of lifelong learning are no longer served by being rigidly compartmentalized into discrete elements. Barriers, which have prevented the use of, appropriate teaching staff, curriculum and facilities along the continuum of learning should be removed. (Boston, *"Why Schools and TAFE Need This New Award"* p4).
- The strengthening of links with schools, universities, other training providers and industry to create valued educational and employment pathways is a key strategic direction of TAFE NSW. (*TAFE NSW Strategic Directions 2000-2002, p2*)

A quick search on the web indicates that similar issues are being confronted in other locations for example:

- In establishing his Education Reform Study Commission in June 1999 Georgia 's Governor Barnes called for the commission to {…" create an education system that is truly seamless and refuses to allow so many students to fall through the cracks. The red tape and bureaucratic roadblocks and bureaucratic turf-guarding that keeps students from taking advantage of all that high schools and technical schools and two-year colleges have to offer must be eliminated." | (*Georgia State Plan for Vocational and Technical Education: FY 2001 – FY 2004* p3)
- In New Zealand the development of the National Qualifications Framework and new school curriculum is viewed by the government as part of its vision of a seamless education system which allows educational opportunities to flourish and to build an education system for the twenty first century. (Ministry for Education, New Zealand, *Education in the 21st Century p1*)
- In support of the government's "one-through road" education policy the Hong Kong Institute of Education plans to develop kindergarten, primary and secondary schools at its Tai Po campus. (*Hong Kong Standard*, 2000)

What Then Is Seamless Education?

Although there does not appear to be a universally accepted definition of seamless education, common themes are evident. The following quotes from the Victorian Office of Further Education and Training (OTFE), capture the core themes.

…"Seamlessness refers to the openness of sectors of education and training

to individuals from a range of educational backgrounds. A seamless education system is one in which each sector, while maintaining its distinctive purposes, has multiple points of entry and exit and thereby encourages lifelong education.

…It will address structural barriers between the school, TAFE, higher education and community sectors to ensure that individuals are able to move freely between the sectors on the basis of their prior learning and current competence.

…is a critical requirement of an education and training system that provides individuals with access to learning throughout their lives." (OTFE p1)

Seamlessness should be viewed from the perspective of the learner and seamless educational pathways are considered one of the necessary features of such a system.

The translation of these concepts into actual implementation of operational strategies and practices poses many questions at both macro and micro levels. For example, how would such a system be resourced? Would it require a restructuring of educational portfolios or structural changes to the supporting administrative systems? Is the concept contradictory to that of a competitive educational market? How will deviations, exits and entries along pathways consistently accommodate work and life experiences? What is the determinant of the speed at which an individual progresses? There are many such questions. Seamlessness is not a simple concept, and perhaps this is the reason that some governments are creating advisory committees and bodies to assist with the clarification, development and implementation of the concept.

Pursuing A Seamless Pathway.

There are significant challenges to be addressed if such goals are to be achieved. In the operational environment of the Hunter Institute the challenges that we face are not unique. Generic or common issues are clearly identified in a number of the papers including those of Doughney (1999) and Leahy (1999) presented at the First National Policy Conference of the Lifelong Learning Network, *Post-compulsory Education and Training; Looking to the Future. August 1999, University of Canberra.* The issues are consistent with Teese's (1999) report to the Victorian State Training Board. Identified issues include:

- TAFE Institutes are funded and accountable to the state government whilst universities are funded and accountable to the commonwealth government.
- Student aspirations and perceptions of the relative importance of higher education as opposed to vocational education.
- Attitudes differ between institutions and although the development of multisector institutions has widened opportunities, student mobility may be limited to localized arrangements. Localized arrangements may also lead to variations in arrangements and standards.
- Partial credit transfer arrangements do not represent a well-defined pathway.
- The introduction within the VET sector of National Training Packages, comprising competency standards, qualifications and assessment strategies may pose difficulties for universities in determining articulation arrangements.
- Differing staff employment conditions between the sectors can prejudice the operation of a seamless approach.

One factor, which directly impacts on the ability to move towards the creation of a seamless pathway, is the level of local cross-sectoral links and arrangements between the school, TAFE and University sectors. It is at this level where the Hunter Institute of Technology has concentrated its effort.

Partnerships And Pathways For The Hunter Institute Of Echnology.

The Hunter Institute of Technology has a number of structural features which are conducive to providing a seamless pathway along the traditional school, TAFE and University sectors.

First, all TAFE Institutes and schools in NSW are part of one government entity. The Department of Education and Training spans the continuum of education from early childhood education to TAFE and community education.

Second, in a number of the 16 delivery locations of the Institute there are several locations where schools and campuses are on adjoining or common sites and consequently educational precincts are in various stages of development.

Third, one of the Institute's campuses, the Central Coast Campus, is a joint venture of the University of Newcastle, the Hunter Institute of Technology and the Central Coast Community College.

These structural features facilitate partnerships (though not necessarily educational) arrangements and links. There is no guarantee that co-location will deliver seamless pathways.

The Traditional Approach To Educational Pathways.

The Institute and its partners have traditionally approached pathways on the basis of credit transfer arrangements from school to TAFE and from TAFE to university. Although this type of arrangement can lead to a pathway it is likened to one with a series of gates separating the three sectors. To move from one discrete sector to another the student must approach a separate gate where credentials are checked, credit given for certain parts of previous study, entry permitted and a new course undertaken in the new sector. Such a pathway is primarily based on one way traffic, with an assumption of an educational hierarchy.

These arrangements have in their own right been very successful. There are extensive school/TAFE credit transfer arrangements, which have been established on a statewide basis. Joint School TAFE programs have also been a feature, 3000 school students in 1999 undertook vocational programs delivered by the Institute.

TAFE/University credit transfer arrangements exist on a statewide basis and also are extensive. These arrangements have been significantly improved by direct interaction between individual Institutes and local universities. In the case of the University of Newcastle and the Hunter Institute of Technology 41 out of 46 of the University's degree programs have credit transfer arrangements from TAFE studies to the University. The majority of the arrangements are based on the successful completion of the TAFE course and TAFE students must meet university admission requirements and gain selection. Arrangements are also in place for the recognition of University subjects within Institute programs. The success of these arrangements can be seen in relation to students moving along a pathway from the Institute to the University of Newcastle, where:

- There has been an increase in offers and enrolments by TAFE sourced applicants every year since 1996.
- In the year 2000, of the 287 TAFE sourced enrolments, over 70% came from Hunter Institute Campuses, a similar figure to 1999.
- 37% of this year's TAFE sourced enrolments were TAFE students in 1999 (up from 35% in 1999).

It is interesting to note that 1323 university graduates enrolled in the Institute in 1999, and a further 1913 enrolled who had started but not completed a degree program. The Institute had 50387 enrolments in the year.

The Movement From Traditional Arrangements In Pursuit Of A Seamless Pathway.

Despite the unique structural arrangements the Institute and partners have at this point not been able to create a truly seamless pathway. It has been our experience that the challenges or barriers that are listed above do exist and the degree to which they can be overcome is variable. The movement from variations of the traditional arrangements is difficult. However, in a number of areas there has been significant progress.

The introduction in Semester 1, 2000 of the Bachelor of Applied Information Technology at the Central Coast Campus represents a significant change from traditional credit transfer pathway arrangements. The Campus is a joint venture between the University of Newcastle, the Hunter Institute of Technology and the Central Coast Community College. These partners envisaged that the Campus would offer a "seamless web of education". (*Campus Review* 1997). Consistent with this vision the Director of the Central Coast Campus initiated the development of the Bachelor of Applied Information Technology program.

The Bachelor of Applied Information Technology has broken new ground in cooperation between the University and Institute and introduced a new dimension to the concepts of articulation and pathways. The program integrates TAFE and university studies.

The degree offers Information Technology (IT) subjects, together with a major study in another discipline of the student's choice, from a broad range available at the Campus. The degree allows students to combine their degree major with the critical underpinning of IT, for example marketing/IT, human resource management/IT, hotel management/IT. University and Institute IT staff were parties to the development of the program and undertake the teaching and coordination of the IT component. For the students it is an apparently seamless program. IT modules across two of the three years of the degree program are drawn from TAFE curricula and taught by Institute staff. Approximately one third of the program, overall, is drawn from TAFE components and delivered by Institute staff.

If students choose to convert their study from the Bachelor of Applied IT to one or more TAFE qualifications, credit is given for those IT subjects already successfully completed. Students who have completed one or more TAFE qualifications are granted credit consistent with the University/TAFE articulation arrangements.

In the development and implementation of this program the issues clearly identified by Doughney (1999) and others were encountered. Many were able to be overcome by the fact that the Central Coast Campus has one administration, common facilities and infrastructure. However the program is not a seamless pathway but rather a seamless program. For the Institute and the University it is an extremely innovative integrated program, which is forcing us to address the administrative and educational issues which must be overcome if a pathway is to be truly seamless.

Administrative issues have in the main been overcome by the fact that the course is a university program, managed by the University and the students enrol in the degree program. The TAFE IT modules have been packaged as 8 university subjects but the students must also enrol in the Institute, pay the Institute administrative charge, and receive both TAFE and University results. Student attendance is in accordance with the university calendar (which differs from the standard TAFE calendar). This is not a problem for the students as all activity occurs within the environment of a completely integrated campus, however, it has required considerable initiative and flexibility by the staff of the teaching and administrative sections.

The program was designed to blend vocational and academic skills, TAFE providing the vocational emphasis " computing for the here and now" which is then built on by the university subjects. All TAFE IT subjects are in the first 4 semesters of the 6 semesters. An essential component was the maintenance of the pedagogical practices of TAFE: smaller classes, teachers with an industry background and orientation, a practical and hands on emphasis, classroom interaction and individual attention. The students, although in the strict sense university students, when undertaking TAFE subjects were to be taught and treated as TAFE students. In practice this has presented a major challenge for the TAFE teachers in adopting an appropriate teaching strategy. Many students when entering the program view themselves as university students expecting a large scale lecture situation with optional attendance which is in contrast to small interactive TAFE classes with more continuous assessments. TAFE teachers consider the program a stimulating program in which to work. The potential problems arising from the different cultures of TAFE teachers and University lecturers has largely been overcome due to a "one staff" management philosophy of the Director of the Campus.

Formal evaluation of the program will occur in line with standard accreditation procedures and there will be ongoing review. In relation to the seamlessness of the program and in the context of a seamless pathway there are a number of improvements and modifications that will need to be accommodated. Entry and exit points for the program are essentially limited to entry to a degree program, with standard credit transfer arrangements, exiting with degree, TAFE statement of attainment or partial completion of each. The program is localized within one faculty and campus, yet this may be an advantage in a competitive education market.

Consideration is already being given to these issues including the integration of vendor qualifications (one of the Institute campuses is a Regional Cisco Academy) and connection of elements of the program to another degree program. At a time of the broadening of the NSW Higher School Certificate and an increased emphasis on vocational education within the school system, the involvement of schools and school students is also under consideration. Submissions have been made to secure funds for technology to enhance cross sector training and will potentially provide the mechanisms to improve the seamlessness of the program and also move it from its current localized base.

CONCLUSION.

The Hunter Institute of Technology does not operate within a seamless education system nor does it have seamless pathways. However the concept of seamlessness is recurrent at all level of operations and is causing us to rethink our traditional ways. Whilst there may be structural barriers to a seamless education system and pathways, and the concept itself may not be clearly defined, it is a concept which can be used to challenge existing arrangements. It may well be something that is not attainable, but rather something to which to aspire. Close links and partnerships with schools and university have enabled the Hunter Institute of Technology and partners to develop programs and pathways that exhibit many of the characteristics of seamlessness. The Bachelor of Applied Information Technology is such a program and presents an exciting opportunity for students and teachers. Whilst it cannot be the sole criterion, the aligning of programs and pathways against this concept of seamlessness can only add to the value of the program. The Institute will continue to build on these programs and with its partners pursue a seamless pathway.

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WORK-BASED TRAINING: EXPERIENCES OF STUDENT INTERNS

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Index: Work-based training, mentor, trainee, qualitative analysis, and vocational education

Abstract: Work-based training is studied via qualitative interviews with 25 students in four vocational training programs, who were met first in school, then in the workplace. Following a description of the internship periods undergone by the students, the process of work-based training is analyzed. The progression of internships and learnings, as described, demonstrates that the activities assigned to the students have enabled them to increase their knowledge and begin their integration into the labor market. The study also examines the students' development at the hands of their mentor and other employees, highlighting the difficulties they encounter.

INTRODUCTION

In Quebec, as in a number of other jurisdictions, work-based training occupies an increasingly important place in the education of students pursuing a vocational or technical diploma. Here we present an analysis of the experiences of students involved in training administered alternately at school and in the workplace. Following an overview of the problematic and the frame of reference guiding our work, we describe the methodology we employed, as well as the characteristics of the students we met. The alternance training model, as it is applied in Quebec, and the characteristics of students' internships are also identified. We then proceed to an analysis of the work-based training process, separate from the students' testimonials. Finally, we examine the training relations that have been woven among the student, his or her mentor in the workplace, the other employees and the teacher at school. We conclude by highlighting some of the difficulties encountered by the students.

1. PROBLEM STATEMENT AND THEORETICAL FRAMEWORK

The necessity of better links between academic education and demands for qualified labor has prompted experimentation with various forms of school-workplace partnership in vocational education. These partnerships have allowed for the delivery of *alternance training*, *cooperative education* and *work-based learning*. Studies into such work-based training experiments have mainly examined the perspectives of teachers (Gérard, 1999) or workplace mentors (Agulhon & Lechaux, 1996; Geslin & Liétard, 1993). Having ourselves already analyzed the experiences of school administrators (Hardy & Parent, 1998) and of mentors (Hardy & Parent, 1999b), as well as of teachers and mentors involved in supervising students (Hardy & Parent, 1999a), we now seek to understand the experiences of student interns involved in such vocational high-school education. This includes several internships, wherein the educational periods in the workplace are alternated with periods of vocational training dispensed in the school environment. Our research question is as follows: What are the characteristics of the learning process of students involved in alternance training or work-based learning?

The chosen framework of reference allows for the examination of students' views on their work-based training experience, as well as on their relations with their mentor in the workplace, the other employees and their teachers. This investigation is inspired mainly by the work of Evanciew & Rojewski (1999), Lechaux (1995) and Stasz & Kaganoff (1997), who studied the experiences of students involved in youth apprenticeship, alternance training or work-based learning programs. The present analysis also draws on the work of Grubb & Villeneuve (1995) and that of Lasonen (1999), wherein the authors investigate the advantages of work-based learning for students. Our analysis concentrates on the modes of actualization of students' work-based learning process, on students' self-evaluation with respect to difficulties encountered and learnings acquired in the workplace, as well as their workplace training relations with their mentor, the employees and their teachers.

2. METHODOLOGY

This study involving the vocational training students is part of a research project into school-workplace collaboration in secondary education, wherein we utilize a case-study approach (Stake,1995). The cases studied or the units of analysis in this research project are study programs. In the current analysis, we focus our attention on curricula involving alternating periods in the workplace. These specific programs are taught in three Vocational Training Centers located on the Island of Montreal. We analyze the viewpoints of 25 students, broken down as follows into one of four vocational high-school education programs[1]: Drafting (n=8), Modeling (n=7), Jewelry-Making (n=6) and Office Skills (n=4). Each of these 25 students granted us an initial interview of 30 minutes during the penultimate month of their school-based studies, and a second interview of 15 minutes during the second part of their last internship in the workplace. The recorded interviews were processed using NUD*IST software.

3. CHARACTERISTICS OF THE STUDENTS

Gender representation varies according to the study program. Two-fifths of the students are women (n=10) and three fifths are men (n=15); however, the women are enrolled in office skills (F, n=4) and jewelry-making (F, n=5), while the men are to be found in drafting (H, n=7) and modeling (H, n=7). A ten-year age gap separates the youngest from the oldest within the group, the average age being 28.3 years. The jewelry-making students are aged, on average, 23.2 years, whereas those in modeling are, on average, 33.3 years old. Between these two groups are the drafting students, with a mean age of 26.4, and the secretarial students, with a mean age of 30.5. The average age of these students is slightly above the provincial average for Quebec students. This figure can be attributed to educational policies in place since 1988, which integrate youths and adults in the same vocational classes, in order to offer a wider variety of programs and maximize returns on investments in equipment for workshop classes.

Prior education is relatively homogeneous in three of the four programs. At the time of their enrollment, four-fifths of the students (n=20) already possessed a diploma of general (n=17) or vocational (n=3) studies. The other fifth (n=5) had completed college (n=2) or university (n=1) studies, or held no diploma at all (n=2). More than a quarter of the students (n=6) had also interrupted other college or technical studies. Half of these students were finishing studies in drafting (n=3). Over a third of these graduates (n=9/25 or 36%) had thus returned to pursue vocational high-school studies after having abandoned (n=6) or completed (n=3) college or university studies. As for work experience, the majority (n=24) had acquired it through full-time employment (n=19). The average duration of such full-time work was 5.61 years. The students in jewelry-making (1.63 years) and drafting (4.33 years) had significantly less work experience than those in modeling (8.5 years) and office skills (10 years).

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[1] - Drafting prepares students for architectural trades; Modeling offers instruction in the manufacture or modification of wooden, plastic casting or reinforced plastic models, used in the fabrication of molds for metal or plastic casting; Jewelry-Making provides training in jewelry design and creation and Office Skills prepares student for secretarial work.

4. ALTERNANCE TRAINING MODEL AND INTERNSHIP CHARACTERISTICS

Work-based alternance training is at once a pedagogical strategy and a method of organizing vocational education and training. The model applied in Quebec has been mainly inspired by that applied in France. It also shares similarities with the Co-operative Education, developed in the United States. This alternance training is characterized by the structured combination of periods of training in an educational establishment and internship periods in the workplace. Within this general framework, several different forms of alternance may be observed, wherein the number of internship periods may vary from two to four, and the total duration of these internships may range from seven to sixteen weeks. The integration of alternance training within a vocational program may be intended mainly to facilitate the acquisition in the workplace of competencies set by the curriculum, or to transfer competencies already acquired to a real-world setting, as well as to facilitate students' transition from learning to practicing their chosen occupation.

The application of the alternance training model varies as follows in the four programs studied: the jewelry-making and drafting programs offer four internships of four weeks each, or sixteen weeks of work-based training; the modeling program includes three internships lasting one, two and three weeks, respectively; and the office skills program integrates two four-week internships. The jewelry-making instructors benefit from an agreement with a major jewelry studio in Montreal that accepts the majority of students in this program. The students in this studio realize a project they developed in class. The students in the other programs are dispersed throughout various companies in their industrial sector, where they carry out tasks assigned to them by the accepting company. To these distinctions among the programs are added the particularities of the students themselves. In jewelry-making, 5 of the 6 students completed their internships in the workshop paired with their school, but the number of their respective internships varied from two to four (2 internships, n=2; 3 internships, n=1; 4 internships, n=2). This is largely attributable to the selection made by the instructors, who refer only the best students. The last student was refused by the target studio for security reasons, and was able to complete only one internship in a family-style studio. In drafting, the majority of students (n=5) completed all four scheduled internships with a single company (n=3) or with two or three different companies (n=2). The other students (n=3) completed only two internships with a single organization. In modeling, all the students completed their three internships with three different companies whereas, in the office skills program, all the students completed their two internships, but half (n=2) changed companies for the second one. The organization of work-based internship periods and their duration vary for each program studied. This multiplicity of approaches to applying workplace training has also been observed by Brochier, Froment & d'Iribarne (1990) in regard to alternance training in France, and by Stasz & Kaganoff (1997) in the context of work-based learning in the United States.

5. WORK-BASED TRAINING PROCESS

Four steps are identified in the work-based training process: 1) preparation and progression of the internship; 2) self-evaluation of the internship; and 3) vocational plans.

5.1 Preparation and progression of the internships

Preparation for the internship includes training received at school, and the search for an internship. The students in all four programs were satisfied with the preparation they received at school prior to their various internships. Nearly half of the students (n=12), however, expressed reservations, stressing the limits of their preparation, to which they attribute certain difficulties they encountered. They note in particular the differences between the tools or instruments they used at school and those that were available to them in the workplace. As for their internship search, the majority of students (n=18) were assisted by the school in securing all of their internships. Several students (n=14) also emphasized the personal initiative they took in approaching organizations.

The progression of each internship begins with the welcome into the organization and is followed by the student's engagement in the internship. During all their internships the vast majority of students (n=21) felt warmly received by the people in their internship environment. They particularly appreciated being invited to participate in the work of the company (n=8) and being able to benefit from the availability of personnel to obtain assistance (n=9). Whichever the internship in question, the tasks performed by the students were varied and corresponded to the job functions learned in school. Almost 7 in 10 students (n=17) further acknowledged that the work assigned to them either was more complex than what they done in school, or corresponded to tasks they had not yet learned. Nevertheless, one third of students (n=9) carried out their assigned tasks with ease, and several (n=7) emphasized the openness of company personnel vis-à-vis questions posed by the interns. These testimonials by the students confirm an earlier analysis wherein the mentors affirmed that they "direct the intern towards tasks that require participation in productive activity and the use of a variety machines and tools." (Hardy & Parent, 1999a, p. 12)

5.2 Self-evaluation of the internship

In evaluating their internships, the students spoke of the difficulties they encountered and the learnings they acquired. With respect to difficulties, the majority of students (n=20) experienced negative aspects in one internship period. During their initial internships, they mainly noted a lack of cooperation from their mentor or company employees (n=7), or their assignment to relatively unstimulating tasks (n=3). In their final internship, they pointed instead to the challenge of overcoming the stress they felt as a result of the relatively complex tasks assigned to them (n=6).

With respect to the learnings acquired during their internships, the students emphasize the acquisition of practical knowledge (n=19), such as new techniques, methods of work, "tricks of the trade" or putting into practices what they had seen in school. They then underline their familiarization with norms relating to the dynamics of the labor market or their occupation (n=9), application to the work in order to meet set objectives (n=6), increased self-confidence (n=5), the development of communication and teamwork skills (n=3) and autonomy (n=3). The learning most often cited reflect the two main stated objectives of alternance training, namely, the acquisition or transfer of competencies set by the study program, and the progressive integration of the student towards practicing the chosen occupation.

5.3 Vocational plans

When the students are invited to specify their vocational plans, the majority (n=15) express a desire to work in the company where they completed their internship. The others hope to find employment in their field of study (n=5) or continue their studies to college-level studies (n=5). Over three-quarters of the students (n=21) consider their internships as a valuable means of transitioning towards future employment; indeed, four of the seven modeling students received offers of employment with the company where they completed their final internship. The students mainly explain the internship's integration-to-work role through workplace integration skills acquired during their internships (n=10), and through references to the internship space as a means of valorizing their training (n=9).

We see no real differences in the work-based training process of the four groups of students. The description of the progression of the internship and associated learnings clearly demonstrates that the activities assigned to the student allowed them to acquire knowledge and to transfer, in a real work situation, the competencies acquired at school, while simultaneously allowing them to begin their integration into the labor market. The students' testimony as to their vocational plans is also eloquent in favor of integration to work, in that the majority of students hope to continue working in the same company which accepted them as interns,

6. WORKPLACE TRAINING RELATIONS

Training relations in the workplace are a manifestation of the type of student training offered by the internship. The students were invited at two separate junctures to describe their relations with their mentor, the other employees and their teachers. In the first interview, at school, nearly three-quarters of the students (n=18) highlighted the assistance they received from their mentor. According to their reports, this support relationship took the form of an attitude of openness that put students at ease, attentiveness and responsiveness to questions, the imparting of "tips and tricks" and the communication of methods of work, as well as patient behavior in the face of challenges, encouragement, explanation and relevant advice. A minority of students limited themselves to describing their relations with their mentor as good or satisfactory for purposes off completing their internship (n=3), or complained of being left to their own devices and of not having received the necessary assistance during at least one of their internships (n=4). During the second interview, in the workplace, half of the students (n=13) continued to characterize their relationship with their mentor as supportive, while the other half (n=12) claimed to be merely satisfied with the guidance they received from their mentor. A third of these students (n=8) also regretted that their mentors were too busy with their own work to have time to sufficiently attend to their interns' needs.

The students' relations with the other employees appear complementary to those with their mentors, and borrow the same configuration. Nearly two-thirds of the students (n=16) qualify these relations as helpful and appreciate having thereby received supplementary training that fleshed out answers to their questions, put them at ease, etc. The other third of students considered their relations to be good or normal (n=5) or stated that they had little or no relations with other employees (n=4). The majority of students thus received almost as much training from other employees as from their mentor. The work environment as a whole became a source of training and the students were able to benefit from more consistent guidance.

In alternance training, a teacher or internship coordinator is intended to visit the student during the internship. During the first interview, some of the students (n=11) had benefited from all of the planned visits, and some (n=11) had not received a visit from the teacher during one of their internships. Almost half (n=11) found these visits helpful, as the instructor spoke with them about their work, offered them some advice, encouraged them and boosted their self-confidence. One quarter of the students (n=6) considered these visits satisfactory and another quarter (n=6) were indifferent to the visits. A minority of students (n=7) expressed several misgivings (n=15) which mainly centered on the bad mood or lack of patience of their teachers (n=4), their lack of readiness to provide assistance (n=3), an overbearing manner that left insufficient room for autonomy (n=3) and occasionally difficult communications (n=3). Seven students, however, reproached their teachers for being insufficiently available, keeping visits too short or not coming to meet with them.

Overall, the students reported having very supportive relations around their work-based training experience. They particularly appreciated the training provided by their mentor and other employees of the host company. They are, however, more severe vis-à-vis their teacher, whom they reproached, among other things, for a lack of availability and patience.

CONCULSION

Since any training experience can be improved, we have, by way of conclusion, grouped together the criticisms expressed by students about the various aspects of their work-based training. The negative aspects highlighted by students relate to the training they received from their mentor and the contribution of the teacher who visited them during the internship. Some students deplore the lack of guidance received from their mentor during the initial internships and the understimulating tasks assigned to them. Would the company have greater difficulty integrating students who were less advanced in their study program? During the final internship, the students regret instead that their mentor has too little available time or is too busy. This fact is consistent with our analysis of mentors' accounts (Hardy & Parent, 1999b), wherein these individuals saw their role in training interns as going unrecognized by their employer, and themselves as failing to benefit from any lightening of their workload that would allow them to supervise their students. Finally, let us note that some students reproach the teacher who visits them for being insufficiently available, for not helping the students enough and for cutting visits too short or failing to visit at all. This last comment calls into question teachers' training with respect to the work-based training of their students and the recognition of this function within their job description. Teaching representatives, however, condemn the lack of time accorded teachers to guide their internship students.

These commentaries invite a reflection on current recognition for work-based training by the industrial and educational sectors. It seems, on the one hand, that some mentors and teachers would benefit from complementary training in the development of interns beginning their vocational training and, on the other hand, that the organizations and institutions involved ought to reorganize teachers and mentors' tasks to free up more time for them to devote to responding more adequately to the needs of students.

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A NEW MODEL FOR WORKFORCE DEVELOPMENT: UNIVERSITY OF NEVADA LAS VEGAS EDUCATOR EXTERNSHIP PROGRAM

Dr. Sterling Saddler, Ms. Gina M. Toth, Ms. Lisa M. Bybee

Index: Workforce Development, Educator Externships, Teacher Internships

Abstract: Educators and future educators must be a part of the continual career awareness and experience process of students and future students. Teachers need to know how their subjects can add to the employability of their students. This program provides a vehicle for school curriculum to be developed and implemented in all academic disciplines.

INTRODUCTION

This paper explains the Educator Externship Program and its purpose and goals. It addresses the benefits of the program for the educator, the schools and students, and the business community.

What are Educator Externships?

The Educator Externship Program is part of a community career awareness program aimed at better preparing students for the workforce of the 21st century. As a result of these experiences, educators will have new tools to ensure classroom learning experiences are more relevant to what goes on in the "real world." All students need to know about the world of work. As students gain insight into career options, they will be able to make intelligent decisions regarding their futures and how to make them a reality.

The Externship experience was designed using the SCANS skills. SCANS (Secretary's Commission on Achieving Necessary Skills) was developed in 1991 by the U.S. Department of Education. These provide a framework from which the Externship was developed and are a part of the skills teachers include in their lesson plans for the Externship and are used as a guide by teachers while participating in the minimum 50 hour on-site work experience. A list of the Three Part Foundations Skills is listed below:

Basic Skills: Reads, writes, performs arithmetic and mathematical operations, listens and speaks

A. Reading - locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.

B. Writing - communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts.

C. Arithmetic/Mathematics - performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.

D. Listening - receives, attends to, interprets, and responds to verbal messages and other cues.

E. Speaking - organises ideas and communicates orally.

Thinking Skills: Thinks creatively, makes decisions, solves problems, visualises, knows how to learn, and reasons.

A. Creative Thinking - generates new ideas.

B. Decision Making - specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative.

C. Problem Solving - recognises problems and devises and implements plan of action.

D. Seeing Things in the Mind's Eye - organises, and processes symbols, pictures, graphs, objects, and other information.

E. Knowing How to Learn - uses efficient learning techniques to acquire and apply new knowledge and skills.

F. Reasoning - discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.

Personal Qualities: Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty.

A. Responsibility - exerts a high level of effort and perseveres towards goal attainment.

B. Self-Esteem - believes in own self-worth and maintains a positive view of self.

C. Sociability - demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings.

D. Self-Management - assesses self accurately, sets personal goals, monitors progress, and exhibits self-control.

E. Integrity/Honesty - chooses ethical courses of action.

The Externship is an opportunity for educators to reduce the barriers between the classroom and the workplace by spending a minimum of 50 hours at a business, labour, non-profit organisation, or government agency. These experiences in industry help educators become more informed about the range of career options open to their students and the knowledge, skills, and abilities needed to excel in the workforce. By working with a business, the educator will gain a new, hands-on perspective of the evolving competencies required in the work world.

During their externships, educators work side-by-side with employees in order to understand their major work responsibilities and the skills, knowledge, and abilities needed to perform effectively. The educators then use this information to connect classroom learning to the workplace and illustrate the relevance of career education to students' futures.

Goals and Objectives

The goal of the Educator Externship Program is to have all teachers (Academic and Occupational) understand how what they teach in the classroom relates to the business/industry world. Through a structured, supervised and coordinated experience, educators will be able to enhance their teaching strategies so that their existing curricula will be infused with current and evolving work-relevant skills. As a result of the experience, educators can better communicate to their students the skills, knowledge, and attitudes necessary to enter careers of their choice. This will allow students to see and understand the connection between schoolwork and their future careers.

Benefits

Externship experiences offer educators the chance to participate in self-directed professional development. Teachers are encouraged to enter an industry related to the subject matter they teach in order to develop an increased understanding of the specific skills their students will need in the workplace. Educators learn about the hiring and termination processes of businesses and the technologies at work in different industries. Emerging technologies, including networked computers and web-based technologies, have led to a rapidly changing workplace and teachers, counsellors, and administrators need to understand how these changes will affect students entering the workforce.

A teacher's experience in the workplace can have an impact on an entire classroom full of students. Educators bring this new knowledge back to the classroom, returning with an increased understanding of the opportunities and challenges students will face in the workplace. This enables the educator to help students select effective work-based learning activities, choose among career pathways or foci of study in high school, and make other important decisions about post-secondary education, training, and careers.

Educator externships provide a remarkable long-term investment for business and industry. Bringing teachers, counsellors, and administrators into the workplace allows businesses to learn about the schools in their area and help educators and business leaders develop a means with which to talk about and plan for further school improvement. With stronger lines of communication between schools and industry, schools can help direct students towards meaningful careers and businesses can reduce their long-term training and recruitment costs and increase their rates of staff retention.

The Educator Externship Experience

It is important that the educator and participating business partner share a set of clear, reachable goals for their time together. Educators gain insight into the ever-evolving requirements of the world of work and businesses are able to provide input to the education system by working collaboratively with the schools. Business partners are encouraged to allow the educator to participate in as many facets of the business as possible, giving the educator a more complete and well-rounded experience.

During the externship program, educators keep journals of their experiences to assist in later translating the experience into learning objectives for their classes. Through journal entries, educators can reflect on how what they did in their Externship job relates to their subject area and what teaching strategies they can use in the classroom to incorporate what they have learned. A sample journal entry is given below:

Sample Journal Entry:

"This ends my journal entries for this internship. I think that it was a very good learning experience for me because it allowed me to see trainers in action and to experience corporate training in an authentic setting. I really enjoyed talking with Wade about training and other educational issues. I am grateful that I had this opportunity.

What has come across in all of our meetings and in the training classes is that employees need to have some basic skills in the area of interpersonal relations. By that I mean that students who wish to go into hospitality must have a generally good outlook and personality and be able to take responsibility for their actions. Teachers in secondary school might address this by including role playing in their lessons when covering hospitality topics in order to engender a sense of reality into the class."

Upon returning to the classroom, educators will have gained a new perspective on the relevancy of their subject area to the "real world of work." The experience in the business world grants teachers a greater sense of one of the key purposes of education: to prepare students for meaningful, fulfilling careers and personal economic success as contributing members of their community.

A Sample Lesson Plan for the Externship would include the competencies listed in SCANS and the Three Part Foundation Skills. The educator would have outlined these skills while fulfilling their 50 hour externship (through interviews and journal notes) thereby developing a lesson plan that addresses the skills and competencies required in today's workplace. As a result, the lesson plan will directly involve students in the acquisition of work-specific or career- related skills as experienced by their instructor in the workplace.

SUMMARY

The Educator Externship Program provides an opportunity for teachers to enhance their teaching. Subject matter content can be made more relevant to students by informing them how it applies to the world of work. Teachers must be familiar with the ever-changing workplace and what skills, knowledge, abilities, and attitudes are required for success. The externship program gives the educator a firsthand perspective of new and evolving competencies through a minimum of 50 hours spent at a business or industry. By implementing what they learn from their experiences into their curriculum, teachers can better prepare students for what to expect in the "real world of work."

WORKPLACE LEARNING AS AN INVESTMENT IN HUMAN CAPITAL

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Index: School-Business Relationships, Human Capital, Human Resources Development, On-the-job Learning

Abstract: The paper considers, on the basis of the theory of human capital, in what sense the various agents involved in work-based learning perceive the on-the-job learning period in vocational upper secondary education as an investment-like activity driven by expectations of long-term benefits held by individuals, enterprises and society. The focus of the paper is an empirical survey of Finnish students, teachers, company managers and workplace trainers participated in a work-based learning pilot project. Students believe that their stay in working life improves their employment prospects, enterprises do not incur any additional costs, and workplace trainers and teachers are coping with their changing duties and roles.

INTRODUCTION

The European Union comprises 15 countries representing the Western industrialised nations and the global economy. There are efforts to free up and promote competition in Europe and globally in all sectors of the economy, the aim being, for example, efficient use of resources and increased productivity of work. Increasingly, the relevant criteria are being set, apart from individual states, by such international organisations as the Organisation for Economic Co-Operation and Development (OECD) but also by multinational corporations and their owners, the big investors, the primary beneficiaries of freeing up trade. More and more, states, national economies, enterprises and individuals are being divided, on the basis of how much they are able to enhance their competitiveness, even at each others' expense, into those who are doing well and those who are being marginalised. Enterprises are similarly seeing individuals increasingly in terms of investment: engaging an employee on a permanent basis is profitable only if the short- or long-term benefits clearly exceed the salaries paid to them or other equivalent costs. An individual can raise their value on the labour market by investing in characteristics considered important by employers, in practice by taking high-status qualifications and acquiring work experience.

This description is underpinned by the theory of human capital. According to Asplund (1996), human-related capital covers the individual's all knowledge and skills, whether inborn or acquired, as well as, defined more broadly, also such things as investments linked with the individual's own health and quality of life, that is, everything that affects the individual's participation in productive activity. As its name indicates, human capital has human qualities. In other words, it can increase or diminish, grow old, leave an enterprise, locality or country with its owner. In neoclassical economic theory, capital is something that yields a profit; its value is not determined by production costs or by the amount of societal work that has gone into it but by the amount of profit it brings. Capital is always effective only for a limited period of time, which means that profit must be made in a relatively short term.

The earned income of more highly educated people is substantially higher than that of less educated people (Jäntti, Kirjavainen and Loikkanen, 2000). However, differences between educational attainment alone do not tell us why people with different levels of educational attainment earn different incomes. The traditional starting point is that the worker's productivity increases with education. Higher education equals higher productivity. In this sense education is an intangible production factor. Education is discussed as an investment of immaterial or intellectual capital. A second explanation for such differences is provided by what is known as the signalling hypothesis, according to which wage differentials reflect social selection. Education is how the worker signals their own abilities to a potential employer. Education requires the same qualities as those demanded by the future employer from their employees, such as talent and perseverance. In other words, education functions as a kind of hiring test but does not necessarily promote productivity or accumulate any intangible capital.

Traditionally human capital has been defined, like other kinds of capital, in terms of the amount of monetary profit yielded when it is invested that is, as the return manifested as higher salaries on the individual level, bigger future profits on the enterprise level, and increased gross national product and enhanced competitiveness on the societal level. Thus, the theory of human capital expands the concept of physical capital to also cover the human means of production (Vaherva & Juva, 1985). However, the human capital that the individual accumulates through education and training also involves other than salary-related effects, such as higher social status, increased mental well-being, increasingly meaningful tasks or access to a more pleasant occupational environment (Asplund 1996; Ertola & Väisänen 1997). Westphalen (1999, p. 10) defines human capital as "knowledge, skills, competencies and other attributes embodied in individuals or groups of individuals acquired during their life and used to produce goods, services or ideas in market circumstances." In this context it is advisable to note that an individual's qualities are in the use of the labour market, but calculating and reporting on human capital is limited to the enterprise level. This paradox is caused by the fact that the acquisition and identification of an individual's knowledge, skills and qualifications are not necessarily only linked with outputs which human capital often refers to. Human capital is considered a concept of economics while the acquisition of knowledge, skills and qualifications are seen as the preserve of education, sociology and psychology. However, human capital cannot be a purely economic phenomenon.

The current vocational education systems in many countries rather emphasizes contextual learning methods than abstract ones. Workplace learning programmes are designed to situate learning in the workplace so as to provide students with contextual, meaningful and relevant use of knowledge. Learning may occur in a community of experienced practitioners in an efforts to situate learning in the context of its utilization. This paper describes the results of a case study on the Finnish experiment of workplace learning in initial vocational education titled *Bridge from Vocational Education to Working Life (2+1 experiment)*.

We propose to describe work-based learning as the individual's, enterprise's and society's human capital investments. We shall draw on four sets of materials from an empirical survey to give preliminary answers to the question of what kind of investment-like features workplace learners, managers of workplaces and workplace trainers, and vocational teachers discern in work-based learning.

WORK-BASED LEARNING AS EDUCATIONAL INVESTMENT

In Finland, arguments for increasing the workplace learning component in education have been based among other things on a desire to increase the efficiency of vocational education and improve students' occupational skill. In addition, research has revealed that skills are acquired more effectively in the context of work than through school-based studying. Educational establishments, enterprises and society all wish to increase the work-based learning component of vocational education and training because formal education has been found to be increasingly out of touch with the everyday reality of the workplace. Teachers may wish to promote work-based learning because organising it creates new links with enterprises and at the same time provides teachers with opportunities for updating also their own occupational competencies (Kulmala 1998; Lasonen, 1999; 2000). Workplaces offer students authentic, challenging and even conflicting learning situations impossible to imitate at school. Enterprises need to be able to recruit particularly floor-level workers as cheaply as possible but also safely. From the perspective of society it seems important to create, as a kind of automaton of economic growth, a system of lifelong learning with a well-functioning alternation between work and education, and an expansion of work-based learning offers good opportunities for running such a model in.

The oldest form of vocational preparation, the master-and-apprentice system, is probably the best representative of systematic work-based learning or learning on the job, and today apprenticeship training continues the tradition. Naturally, similar (non-formal) work-based learning takes place all the time also as employees perform authentic tasks at the workplace. Even in formal education, work practice has been an important aspect of many vocational qualifications. However, work-based learning is new as a term - in Finland it appeared only in the middle of the 1990s. It refers to goal-directed and supervised studying at a workplace amounting to at least 20 credits(formally equivalent to a week's full-time studies). The aim is that the student will learn a part of the occupational skill required for the vocational qualification in question and of the relevant curriculum objectives at the workplace while also acquiring general readinesses for working life and lifelong learning. Work-based learning is distinguished from earlier work practice not only by the length of the work-based learning period but also by the fact that previously students went to the workplace to practise things that they had learned at school while today they are supposed to learn new things, that is, a part of the contents of their vocational qualification.

RESEARCH PROCEDURES

A consideration of also work-based learning as a form of investment can be justified on the basis of the finding that individuals, enterprises and society as a whole expect their educational activities to yield a return in the long term. As regards enterprises, organising work-based learning placements can be seen as a conscious choice because it is a voluntary one. It is an investment-like decision whose attractiveness, often involving the unpaid contribution of the students, is increased by society's monetary compensation. For students, by contrast, work-based learning periods are an obligatory extension of their education, which means that in their case the "investment decision" is made simultaneously with the decision to apply for or accept a student place. However, the effects of a work-based learning period are not necessarily always positive from the point of view of society, because students can learn at the workplace also many things that are disadvantageous in educational terms.

The empirical surveys discussed below were administered separately to managers of Finnish enterprises providing work-based learning placements, their workplace trainers, and Finnish vocational students and teachers. The materials had been collected by Johanna Lasonen using questionnaires designed for a follow-up of a Finnish vocational education reform pilot project, the Bridge project (the questionnaires were returned as follows: students 435, teachers 110, workplace trainers 217 and managers 247 questionnaires). It is to be noted here that the questionnaire was designed to cover the targets of the Bridge project as a whole, among which the benefits and disadvantages of work-based learning represented only one subtarget (Lasonen, 1999; 2000).

The target groups of the pilot research consist of students, employers, trainers and teachers who responded to the structured questionnaires. The study aimed to survey to what extend the workplace managers, students, trainers and teachers regard students' work-based learning and mentoring as investment for human capital.

RESULTS

The Individual's Perspective on Work-Based Learning. Of the students who answered the questionnaire, a little more boys than girls, a third were under 20 and a third between 20 and 21. Only a good fourth had no earlier education beyond comprehensive school or upper secondary school while the majority had already completed some vocational qualification.

The students were asked why they had taken up studies leading to this particular basic qualification. A good half of them mentioned better employment prospects, nearly the same proportion brought up their interest in the occupational field in question while a good fourth told that they wanted to improve their access to further and higher education. The students thought that their studies had affected their occupational competence, their ability to understand and accept different people, and their employment and career prospects - all obvious individual and societal yields of human capital investments. The strongest negative effects of their education seemed to concern their willingness to set up an enterprise of their own, their financial situation and their ability to find a new occupation as well as their chances of continuing their studies. A poor financial situation is linked with the opportunity costs of human capital investments while the students' reluctance to become entrepreneurs is probably connected with their increased familiarity, though their studies, with the difficult early stages of and the economic risks involved in entrepreneurship.

Among the study fields covered, the most exceptional were social and health services, where the students rated the effect particularly of their studies on their financial status more negatively, but on such things as occupational skill and self-esteem more positively than did the other students, and business and administration, where the students expressed more positive opinions about the effect of their education on such things as their employment prospects and their willingness to set up an enterprise of their own. By contrast, technology and transport students are more pessimistic about their further and higher education prospects and about continued studies in general.

Guidance was also available at the workplaces because only a good tenth of the students mentioned insufficient guidance as a reason for possible difficulties. Most students singled out practical skills and job-specific skills but also social skills and self-confidence as those things that they had learned particularly well. They thought that during their studies they had gained most as regards initiative, practical skills, cooperation skills and self-confidence, least as regards, for example, the skills needed to conduct business in foreign languages and to set up an enterprise of one's own, and writing skills. The students' answers foregrounded practical work experience and improved employment prospects as their best experiences, which thus emerged as the most obvious return to their human capital investment, but some of the respondents also mentioned things related to the social aspects of their training and to learning and personal development.

Managers' Views of Work-Based Learning. The size of an enterprise seemed to be a factor in attitudes towards future provision of work-based learning: managers of enterprises with a turnover of FIM 1-5 million and with a staff of 3-5 people were more sceptical than the other groups about being able to commit themselves to providing work-based learning also in the future, while the biggest enterprises are, naturally, best able to take on new staff in the next few years. Nearly half the enterprises that answered the questionnaire have had, during the preceding year, only 1 workplace learner, while a little less than a third had had 2-3 students and every seventh enterprise 4-6 students. Among the respondents not quite a tenth represented enterprises with 10 workplace learners.

In a battery of statements about the links between education and working life the workplace managers were asked among other things how much workplace learners add to the costs of the enterprise: the average of the managers' answers is among the lowest in the whole question battery, ranging between "a little" and "very little" and indicating that on average the enterprises incur no additional costs because of workplace learners. Managers of small enterprises of 1-2 people (and, on the other hand, with a turnover of FIM 5-10 million) rated the costs relatively higher but still no higher than "a little". In terms of the enterprises' line of business, only the public sector deviated from this line by rating the costs, on average, even lower. The economic attractiveness of taking on workplace learners is revealed by a question concerning the drawbacks of cooperating with educational establishments: only 2 per cent of all respondents mentioned cost-related things as drawbacks to cooperation linked with work-based learning.

Among the statements included in the question about the links between education and working life, the most positive responses were elicited by the investment-like statements "I am willing to commit myself to provide work-based learning also in the future in my enterprise" and "I wish to develop cooperation with educational establishments and organise students' work-based learning". As for the practical promotion of an improved fit between education and working life, offering students a workplace learning placement and training oneself were the methods mentioned most often by the managers.

The managers assessed the effect of different factors on their selection of new employees on a four-step scale. The averages indicate that the respondents lay the greatest stress on the employee's positive attitude and initiative and on their personal qualities in general. They pay least attention to the job applicant's sex and language skills and their possession of an extended qualification. As regards the distinct broader components of human capital included in the list, on average the managers considered previous work experience fairly important, as they did the possession of a relevant vocational qualification. Relatively speaking, an applicant's previous work experience seems to have the play greatest role in the recruitment decisions of middle-sized SMEs.

The respondents were asked to assess, on a similarly four-step scale, how important a number of general qualities required in working life were in jobs in their field. As in the previous question concerning the qualities influencing their selection of new employees, the managers considered a positive attitude and initiative but also cooperation skills and practical field-specific skills the most important qualities. It appears that the respondents' workplaces need least the skills required to conduct business in foreign languages, writing skills, a knowledge and skills base for further and higher studies, and obedience. When the respondents were asked to pick from the list the three qualities that they considered most important, a majority singled out practical field-specific skills as the most important qualities, with cooperation skills and a positive attitude placed as second and third respectively. Initiative and an ability to solve problems on one's own also gained a relatively great deal of support as the second most important quality. Both small and big enterprises were comparatively unanimous about the importance of the different qualities in jobs in their field.

The managers and the students were asked about the skills and qualities needed in working life on the one hand and provided by the students' education on the other. A comparison of their answers suggests a fairly good fit between education and working life even if the managers consider that working life needs even more of most of the qualities provided by the students' education, except for writing skills. The relatively smallest differences between the skills needed in working life and the skills provided by the students' education are found in the ability to use information sources and in mastery of the knowledge and theoretical base of the given occupation, the greatest in initiative, independent thinking skills and life management.

Altogether, the answers lead to the conclusion that large industrial enterprises in particular see educational cooperation and provision of work-based learning placements as a way to ensure the future availability of competent personnel, naturally an important factor from the point of view of the enterprise's productivity and its ability to achieve its future targets.

The Perspective of the Workplace Trainers. The workplace trainers were asked about the personal disadvantages involved in the supervision of work-based learning. Nearly a third of those who took part in the survey thought that there have been no disadvantages, but on the other hand a third considered the additional work and responsibility linked with supervision as a disadvantage and a good fifth mentioned also being pressed for time. When they were asked about the benefits of cooperation with the educational establishments, the workplace trainers mentioned most often the broadening of their own perspective and acquiring new information about today's education or about other things, while those trainers who mentioned access to labour and the student's contribution as the relevant benefits clearly represented the enterprise's point of view. As for the benefits from cooperation with teachers, those mentioned most often by the workplace trainers were acquiring information about the students or about the expectations of the educational establishment and discussions with the teacher. Every sixth trainer claimed that there has been no collaboration at all or that it had brought no benefits.

The respondents were also asked about their readiness to commit themselves to serve as workplace trainers. A fifth are either unwilling to make such a commitment or have not decided yet, while a majority (50%) of those who expressed willingness to continue as workplace trainers said that they were ready to commit themselves for at least a few years or for an indefinite period.

The workplace trainers considered that the students learn to work relatively independently in a month at most or depending on the student or task. The trainers' answers suggest that the work-based learning experiment had had a positive effect on developing the enterprises' operations, clarifying their targets and finding new ideas. Only a good fifth of them answered that the experiment has not had much effect while a little less than a tenth did not know.

The Perspective of the Vocational Teachers. Nearly six out of ten of the vocational teachers who answered the questionnaire were women. They have mainly upper college-level and university-level qualifications and many of them had, in addition, long work experience from working life (only some every tenth had no such experience). Half the respondents have taken part also in workplace trainer training.

Work-based learning has meant that there are now new elements in the teacher's work that have broadened its scope and enriched it by requiring the teachers to develop professionally as regards both pedagogic and cooperation skills. Despite reduced teaching hours, the teachers' overall workload seems to have increased. The new challenges and greater variety involved in their work stem from new learning and teaching environments and more individualised curricula. Work-based learning requires the teachers to invest particularly their free hours, but as benefits may be considered many things that are making their work more varied. According to the teachers' answers, the benefits gained by the educational establishment from work-based learning include, apart from partners and help in planning, also an incentive to rationalise their operations and focus on their own strengths or the foundations of acquiring occupational skill.

When the teachers were asked about the targets that they set for their students' work-based learning, they mentioned most often the student's finding a job and/or establishing relations with employers, learning their occupation, increased work experience, learning new things, acquiring working-life skills, learning customer service, receiving a salary, becoming independent, internalising the role of an employee and doing good in their studies. Benefits from work-based learning mentioned most often by the teachers included networking and the improved employment prospects it brought, increased work experience and occupational skill, the function of the work-based learning period as a probationary period during which the employer can try out a possible new employee, the student's own opportunity to find out whether the occupation suits them, and the chance that both parties have to get to know each other. The teachers think that work-based learning promotes various working-life skills (such as cooperation, social and communication skills), practical occupational skills, independence, easier transition to working life, mastering comprehensive wholes, the growth of a sense of responsibility, learning and applying what one has learnt, and problem-solving skills. The qualities developed by work-based learning most often mentioned by the teachers were initiative, practical skills, cooperation skills and self-confidence.

There was a great deal of overlap between the qualities that the enterprise managers mentioned most frequently as those most important in jobs in their field and the skills brought up by the teachers and the students.

Cooperation between educational establishments and enterprises offering work-based learning placements is not new as such, and both the teachers and the workplace trainers consider that it already works fairly well. Naturally, increased efforts to develop collaboration on work-based learning and to disseminate relevant information presupposes increased time and other resources, that is, increased human capital investments both from society and enterprises.

SUMMARY

Despite a good half of the students reporting that they were studying to improve their employment prospects, the students' overall expectations concerning the return of their investment in education were as expected because finding one's study field interesting was nearly as important a reason for undertaking studies towards the given qualification as was finding oneself a job. The studies were perceived to have a positive effect on occupational skill, understanding and accepting different kinds of people, and employment and career prospects, things that are, simultaneously, obvious individual and societal returns of a human capital investment. By contrast, education had a less positive effect on the students' willingness to set up an enterprise of their own and on their financial situation. The students who had taken part in the work-based learning experiment felt that they had, through work-based learning, acquired many skills of a kind considered also by the enterprises as the most important preconditions of successfully performing the tasks in their field and as the most important criteria used by them in selecting new employees.

While the workplaces provided an opportunity to learn situation-specific dimensions of the work by experience, the educational establishments enabled the students to gain a broader understanding of their future occupation. The workplaces were considered the best places for learning sociability, gaining an overall grasp of various aspects of the occupation, learning to think and learning the customs and rules of the work community.

In the eyes of the managers of the enterprises offering, in the Bridge experiment, work-based learning placements to students of vocational upper secondary education establishments, a positive attitude and initiative and personal qualities in general are, among the subsectors of human capital, more important recruitment criteria than, for example, education and work experience. The managers' answers suggest that these qualities, related to proper attitudes towards work and to cooperation skills, are - in addition to practical occupational skills - those most needed also in tasks in the respondents' line of business. By contrast, foreign language and writing skills (often considered important by educational establishments) are rated as the least important qualities.

The managers' answers to the questionnaire suggest that work-based learning is seen in enterprises as a longer-term investment even if managers of enterprises of different sizes and representing different lines of business do not, naturally enough, in all respects agree on its benefits or profitability. Particularly in a short term, promoting the enterprise's productivity is not among the most important functions of work-based learning, but work-based learning is considered a suitable method of, for example, developing cooperation with educational establishments and of orienting new employees.

Large industrial enterprises benefit from work-based learning primarily in the form of easier recruitment while the owner-entrepreneurs of small enterprises and the self-employed gain also new ideas and partners. The size or line of business as such of an enterprise do not seem to affect its ability to organise work-based learning, but as also earlier research has shown, in smaller enterprises it is more difficult to provide workplace learners with a supervisor trained for the task. On the other hand, the smaller enterprises often operate in fields where tasks can be more varied and comprehensive than those that workplace learners are offered in, for example, enterprises engaged in industrial production.

The survey among the workplace trainers reveals that supervising students increases somewhat the workload and responsibilities of the employees who become trainers, while gaining new knowledge and new perspectives are the things most often mentioned by them as the benefits of their new task.

The teacher survey suggests that work-based learning has meant that the teacher's work now has new elements that have broadened its scope and enriched it by requiring the teachers to develop professionally particularly as regards pedagogic and cooperation skills. There have been some changes in the role of the vocational teacher, and despite reduced teaching hours the teachers' overall workload seems to have increased. At the same time, a better fit between education and working life has enabled also educational establishments to rationalise their operations and to approach their tasks in an more systematic manner.

It can be observed by way of a summary that all the parties covered by the survey consider that work-based learning achieves quite a good fit between education and working life. Considering work-based learning from the perspective of investment showed that on average the students believe that they are acquiring skills essential for entry to working life and improving their employment prospects, that the enterprises incur no additional costs because of taking on workplace learners, that the workplace trainers do not see their supervisory duties as too much of a distraction from their main job, and that even the teachers are mainly satisfied with the changes that have taken place in their work. However, on the reverse of this overall picture we find the fact that the students are not given enough guidance, that unpaid work does not motivate, that in small enterprises unreasonable amounts of time are sometimes spent on orienting and guiding the student, that a workplace trainer may be reluctant to guide the students or lack the requisite skills, that the teachers' workload has increased and that they are constantly pressed for time and suffer, as a result, from feelings of inadequacy. On the other hand again, when the requirements of working life change rapidly in some fields, work-based training is one of the best methods of preparing young people, particularly those at risk of unemployment, successfully for an occupation.

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SUPPORTING LIFELONG LEARNING
THE NEW INTEGRATED SCOTTISH QUALIFICATIONS SYSTEM

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Index: Lifelong learning, Vocational Qualifications, Outcome-based units; National Qualifications Framework; Scottish Qualifications Certificate

Abstract: The new National Qualifications system in Scotland represents the coming together of the previous academic and vocational qualifications systems in schools and colleges. The new qualifications are based on a single curriculum, assessment, quality assurance and certification system covering all subjects from Chemistry to Care and English to Engineering. The new modular qualifications are built up of outcome-based units.

The launch of the new qualifications has been accompanied by the launch of the Scottish Qualifications Certificate. This is a cumulative, computer-based certificate which will show success in every unit and programme which a learner achieves.

INTRODUCTION

In the summer of 2000, in the very week of this important IVETA conference, a very significant event will take place in Scotland. The first large-scale issue of a new kind of certificate will take place to recognise students' success in the new National Qualifications in Scotland.

Before continuing to describe this system, it may be useful to draw your attention to Appendix 1 which contains definitions of some of the general terms used in this paper since there can be considerable variation in definition of terminology between countries operating qualifications systems.

New National Qualifications

The significance of our new National Qualifications for the theme of the IVETA conference arises in three ways.

Firstly, the new National Qualifications system in Scotland represents the coming together of the previous academic and vocational qualifications systems in schools and colleges.

The reform is based on a system that has been developing since the early 1980's aimed at raising the quality and quantity of education and training provision. The model has the following characteristics. It is:

- Coherent – providing clear progression routes between qualifications by the development of an integrated national framework of qualifications
- Responsive – the modular (also called 'unitised') approach ensures the content of the learning is relatively quick and easy to adapt to changing needs
- Interactive – allowing for more learner-centred approaches to learning including distance and IT-based learning

- Flexible – allowing flexibility of entry to qualifications and flexibility with pace and place of learning
- Credit-based – providing credit for prior learning and for partial success by certification of individual units
- Open and fair – the standards required for success in a qualification are specified in advance and available publicly
- Focused on positive achievement – the assessment focuses on what a learner can do

The new National Qualifications have been developed to meet the needs of increasing numbers of young people who are staying on in education and training beyond the compulsory school leaving age of 16. Therefore new subjects and new levels have been introduced so that everyone has relevant and challenging, but achievable. courses available to them. The new qualifications are based on a single curriculum, assessment, quality assurance and certification system covering all subjects from Chemistry to Care and English to Engineering. One of the main aims of the new system is to ensure that achievement in vocational and academic subjects has equal value in the eyes of parents, students, further and higher education institutions, and employers.

The new qualifications are built up of outcome-based units which can be studied free-standing or can be combined into certificated programmes. Additional flexibility is built into the system by having design rules that identify selection from a range of optional units in addition to the required compulsory units.

The units provide the publicly available standards against which the students are assessed. We have tried in our new qualifications to combine the advantages of internal and external assessment to ensure a valid, reliable and credible national system. Units are assessed internally by the teacher or lecturer and are not graded. Assessments can be taken when the learner is ready. To ensure that internal assessments achieve the consistent application of national standards, we have developed a national bank of assessment instruments that are available to centres on CD-Rom. On successful completion of a course learners must pass an external assessment that may be an examination or, for vocational subjects, may be a practical project or performance. This external assessment requires the learner to integrate knowledge, understanding and skills from the units that make up the course. This external assessment is devised and marked by SQA and is graded.

There are no age limits or entry requirements for the new qualifications – and their modular nature and wide-ranging catalogue of units means that they can meet all learners' needs. They are designed to link to the more advanced qualifications of colleges and universities and to the qualifications designed to test full employment competence. There are also qualifications within the national qualifications framework for those with learning difficulties. A diagram illustrating the SQA framework of qualifications and how they link to university degrees is provided in Appendix 2 of this paper.

One of the features of the new National Qualifications is their emphasis on 'core skills' – those key competences required by individuals to function effectively in personal, vocational and occupational contexts and as lifelong learners. The skills that have been identified in Scotland as critical for personal development and performance are: communication, numeracy, problem solving, information technology, and working with others. Standards for these core skills have been developed at each of 5 levels of the new National Qualifications system.

The second link with the theme of the Conference is that the launch of the new qualifications has been accompanied by the launch of the Scottish Qualifications Certificate. This is a cumulative, computer-based national certificate produced by SQA which shows success in every unit and programme which a learner achieves. It grows as the learner adds new successes year-by-year and includes automatic calculation of achievement when the learner has entered for programmes of units (such as diplomas). Success in a programme is also recognised by the issue of a special commemorative certificate. The Scottish Qualifications Certificate is, in effect, a lifelong learning record of success in all the qualifications in the Scottish Qualifications Authority portfolio. The importance of core skills is demonstrated by their being listed separately on the Scottish Qualifications Certificate.

Thirdly, the new qualifications system and the new certificate are being developed to extend ways in which successfully-completed learning can be rewarded. This is responsive to the government's ' inclusion' policy that aims to encourage the disadvantaged back into learning. Initiatives include recognition for smaller "chunks" of learning and quality assessment by SQA of non-certificated training. New link-ups with other organisations such as the broadcasting media are being developed to encourage people to come back into learning and to aim for the achievement of qualifications. A recent example was a link with the BBC to promote the use of the Internet through television programmes and an interactive training CD-Rom.

As another element of flexibility, more responsive forms of assessment, including on-line assessment, are being explored so that assessment is available where and when the learner is ready for it. These are being developed alongside all the exciting developments in on-line teaching and learning. In the next few years we will move increasingly to ICT-based assessments that will be better targeted to individuals and be less time-consuming because they will be adaptive. The system will use the full range of possibilities which smart software and web-based resources offer. This should take us well beyond the computer-based standardised testing that has been used for some years. We are developing ICT-based assessment banks and can envisage the development of software smart enough to vary the values and contexts in standardised types of questions. However, assessment of performance evidence may be slower to be absorbed into the ICT system. Although the use of internet-based video-conferencing can link the assessor and learner who are geographically apart, the challenge is to ensure that we have dealt effectively with the authenticity and security issues. This is critical if we are to retain confidence in the assessment results.

CONCLUSION

We have been actively involved in the reform game for twenty years and we still have many challenges to face. The opportunity to share ideas and experiences at this prestigious international conference is invaluable in shaping ideas for the way ahead.

APPENDIX 1

Definition of Terms

Standard	a set of information which forms the basis of an assessment judgement
Unit or module	a self-standing group of related skills and knowledge – standards - against which an assessment judgement will be made
Qualification	a set of standards which form a package of achievement worthy of formal recognition in a certificate
Learner	any individual engaged in learning, whether in a school, college, university, training organisation, home, workplace or through open, distance or technology-based approaches

Assessment	the process of comparing evidence produced by a learner against a standard
Centre	the organisation responsible for the assessment of the learner's achievements against the standards. Centres can be schools, colleges, universities, training organisations, skills-testing services, workplaces and other appropriate organisations

APPENDIX 2

Scottish Credit and Qualifications Framework

Capability			Competence
Masters/Post Grad degree			SVQ 5
Honours degree			
Bachelor degree			
Deg Yr 2		HND	
Deg Yr 1	Adv Higher	HNC	SVQ 4
Higher			SVQ 3
Intermediate 2			SVQ 2
Intermediate 1			SVQ 1
Access 3			
Access 2			
Access 1			

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KEY POLICY ISSUES IN THE PROMOTION OF INFORMATION TECHNOLOGY IN VOCATIONAL EDUCATION: SOME LESSONS FROM THE FIVE-YEAR STRATEGY IN HONG KONG

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Index: Information Technology, Policy Evaluation, Vocational Education

Abstract: In this information era, the promotion of information technology (IT) in education has become an important agenda for governments all over the world. In June 1998, the Hong Kong Government of the Special Administrative Region (HKSAR) published a policy document entitled "Information Technology for Quality Education: Five-Year Strategy 1998/99 to 2002/03" as a blueprint for the promotion of IT in education. Despite the commitment and financial support provided by the HKSAR government, several problems have been identified in the policy plan and in fact, have emerged in the course of its implementation. This paper applies four key policy evaluation categories – namely, technical feasibility, political viability, financial feasibility and administrative operability to suggest ways for improvement and to explain their relevance in promoting IT in vocational education.

INTRODUCTION

In his maiden Policy Address to the Legislative Council in October 1997, the Chief Executive of the Hong Kong Special Administrative Region announced the launching of a five-year strategy to promote the use of information technology (IT) to enhance teaching and learning. In view of the extensive nature and the large amount of resources that have been promised to achieve the plan, it is important that the preconditions for effective implementation have been sufficiently considered. However, since the policy strategy was launched, several problems have emerged that undermine the goals and effectiveness of the strategy. This paper aims to make a critical evaluation of the Five-Year Strategy through a policy analysis perspective and a comparative approach that focus on relevance of objectives and implementation issues to provide insights on promoting IT in vocational education. The four essential evaluation criteria in policy analysis are namely: technical feasibility, political viability, financial feasibility and administrative operability. Through the application of these four evaluation criteria, some practical suggestions are made with regard to the planning and implementation of strategies in promoting IT to bring about desired learning outcomes.

PROMOTING INFORMATION TECHNOLOGY IN EDUCATION

There has been an exponential growth in the use of communication and information technology in the past decade or so. But Hong Kong has lagged behind other advanced countries in developing a coherent policy in response to the technology revolution. In recognition of its tremendous impact on people's daily lives and the need to catch up with other advanced countries, the Chief Executive stated in his first Policy Address of 1997 that Hong Kong 'should aspire to be a leader, not a follower in the information world of tomorrow'. Since education plays a key part in the pursuit of this important goal, he has pledged to formulate a five-year strategy for the application of IT in promoting the effectiveness of teaching and learning. In June 1998, a formal document entitled 'Information Technology for Quality Education: Five-Year Strategy 1998/99 to 2002/03' (hereafter called the Five-Year Strategy) was published as a blueprint for the collaboration among the Government and various key players. Before the issuance of the Five-Year Strategy, the Education and Manpower Bureau has only taken piece-meal measures in providing IT exposure for students and teachers.

In the Five-Year Strategy, a vision has been set 'to harness the power of IT to help our students get the most out of school education'. To support this vision, three strategic objectives have been identified. The first objective is to arouse and maintain students' motivation to learn through the use of IT. The second objective is to broaden students' horizons, so as to enrich their learning experience and facilitate the development of a creative mind which are essential to enable students to be adaptive to changes in this global age. The third objective is to encourage independent lifelong learning and instill team spirit among students (Five-Year Strategy, 1998: para. 2). To achieve these objectives, four missions have been listed for the five-year period. They include helping teachers to settle in their new role as a 'facilitator', incorporating IT elements in the school curriculum, progressively enhancing the provision of IT facilities and educational software for schools, and building up a network infrastructure to facilitate sharing of educational resources (para. 6).

In corollary, there are four key components in the Five-Year Strategy: teacher enablement, curriculum and software, hardware provision, and network infrastructure. Teacher enablement has been identified as the most important component in the Strategy since teachers' willingness and ability to teach through IT will directly affect the successful implementation of the goals set. As for implementation, the Five-Year Plan stipulated the setting up of an advisory committee comprising representatives from the Government, the school sector, tertiary sector and IT industry to provide a steer for the Strategy and to oversee its implementation. It has been specifically mentioned that the Strategy is not meant to be implemented in a top-down manner, but schools are expected to formulate their own IT plans tailoring to their specific needs. The Plan also proposes setting attaining targets for students at key learning stages at both Primary and Secondary levels.

Although the Five-Year Strategy only applies to basic education and secondary technical schools, it has an important role to equip secondary school leavers with the essential knowledge and competence for more advanced training at vocational and tertiary levels. Technical and vocational training provides an alternative route to school leavers who may not be able to proceed to mainstream higher education programmes. In fact, it serves to train manpower for the economy at craft, technician and higher technician levels. Since technical training and vocational education occur in a number of modes and are offered by various institutions, it is less appropriate to adopt a uniform approach in promoting IT in all their courses. Nonetheless, for the Hong Kong Institute of Vocational Education (IVE) which is publicly funded and is the main provider of courses from basic craft to higher diploma level, it can draw on the experience from the Five-Year Strategy to develop a more cost-effective and practical approach to enhance its training.

FROM POLICY TO IMPLEMENTATION

Taken at face value, the Five-Year Strategy seems to be both comprehensive and attentive to relevant issues concerning the adoption of IT in education. However, as often shown by experience both locally and overseas, even the most meticulous and well-intended policy may not always be implemented as planned nor bring the desired outcomes. To ensure that the identified goals of a plan or policy can be attained, it is essential that evaluation criteria be developed for objectives set and that possible constraints on implementation be anticipated. Numerous authors (Bardach, 1972;

Quade 1975; Dunn, 1981; MacRae and Wilde 1985) have suggested categories of evaluation criteria in policy analysis and planning. The more commonly applied ones can be grouped into four broad categories: technical feasibility, political viability, financial feasibility or possibility, and administrative operability (Patton and Sawicki, 1993: 207). These categories can be briefly described as follows:

- ***Technical feasibility*** includes criteria that measure policy outcomes to see if they achieve their purpose. They address the basic question of whether the proposed action or strategy will work in a technical and practical sense. The two principal criteria under this category are *effectiveness* and *adequacy*. The criterion of effectiveness focuses on whether the proposed policy will have its intended effect; whereas adequacy measures how far toward a solution or stated objective we can proceed with resources available.
- ***Political viability*** is mainly concerned with the impact of policy outcomes on relevant power groups such as decision-makers, legislators, administrators and any affected groups. The central question is whether one or more policy alternatives will be acceptable or can be made acceptable to the relevant groups. The criteria that assess or measure political viability are often subjective and less quantifiable. The common criteria used include *acceptability* to relevant actors, *appropriateness* of policy in meshing with values of society, *equity* in terms of impact, and *responsiveness* in meeting the needs of target groups.
- ***Financial feasibility*** focuses on availability of funding, and considerations of costs and benefits of a policy or programme. Since any new policy will require extra resources and has fiscal implications, policy-makers must be able to justify the incurred cost and explain how proposed actions can benefit the relevant client groups or society in order to obtain support from funding authorities. In evaluating financial feasibility, there is a tendency to rely on 'hard' quantitative measures, but often the less easily monetarizable aspects also have bearing on the desirability and value of a proposed policy or programme.
- ***Administrative operability*** assesses how possible it is to actually implement the proposed policy within the political, social and, most important, administrative context. They are concerned with whether required expertise and staffing are available, whether employees will cooperate in delivering the service, and whether the necessary physical facilities are there. The common criteria to consider in evaluating administrative operability include authority, institutional commitment, staff capability, and organizational support.

These four categories in evaluating policy are inter-related and have relevance for each other. They are useful in anticipating possible constraints at the implementation stage and in assessing the appropriateness of proposed actions in meeting set objectives. In fact a comparative study by Pelgrum and Plomp (1993) on "Computers in Education in 21 Education Systems" of which the set of indicators used such as hardware availability, software availability, type of use, relevance and training etc. can also be classified under the four broad categories of policy evaluation. They are used as the analytical framework in the following section to assess the efficacy and possible limitations of the Five-Year Strategy, as well as their implications on promoting IT in vocational education.

LESSONS FROM THE FIVE-YEAR STRATEGY

(a) Technical Feasibility - Although the Strategy has not yet been fully implemented, an assessment of its *effectiveness* can be partly based on the experience of other countries that have adopted IT in education and partly based on the relevance of proposed measures in meeting the objectives. As found in Pelgrum and Plomp's study (1993), hardware availability, software availability, organizational and infrastructural support, and training are necessary for the introduction of IT in education. With reference to the three set objectives in the Five-Year Strategy, the proposed measures under the four key components such as the provision of training to teachers, IT equipment and development of educational software etc. seem to provide the essential conditions to facilitate their effective fulfillment.

However, since 'effectiveness' is concerned with whether the proposed policy will have its intended effect, many of the proposed measures only provide the necessary, but not sufficient conditions to achieve the stated objectives. This is particularly so when some of the objectives are less straightforward, and that the policy effects are longer-term and indirect. As pointed out by Roblyer et. al. (1997) and Selwyn (1998), there is a lack of hard evidence on effectiveness of IT in facilitating students' achievement and bringing desired learning outcomes. The difficulty in assessing effectiveness is further complicated by the ambivalent nature of policy objectives in the Strategy. Given the many different rationales that can be presented for introducing IT in education, it seems that the Strategy has not clearly spelt out the priority between the pedagogical function and other goals of IT[1]. Its three stated objectives seem to imply that IT is inherently beneficial and is the panacea to improve education.

Although the goals of vocational education appear to be more specific in terms of providing practical pre-employment training, the incorporation of IT in teaching and learning equally involves a 'paradigm shift' from a teacher-centered approach to a more interactive and learner-centred approach. Teachers would need to play a guiding role in cultivating students' proper attitude and constructive approach towards the use of IT. In policies relating to education, human and behavioural aspects are crucial to put its intended goals into effect. More attention should be given to the user context (i.e. motivations, intentions and advantages called into play by use of technology) and cultural context (i.e. norms and values of society) of technological implementation.

(b) Political Viability - Notwithstanding the general consensus on the importance of IT in the current knowledge society and acceptance of the functions of IT in education, different sectors of the community have quite diverse views towards the Five-Year Strategy. Since the policy was initiated by the Chief Executive, it has gained wide support from both legislators, executive councillors and members of the Education Commission. However for some educational coalitions such as the Professional Teachers' Union, they are critical of the Strategy and its proposed measures despite their acceptance of the policy in principle. The major criticism of these groups is that the Strategy does not have a long-term vision and fails to give sufficient thoughts on the overall direction, objectives and institutional framework for its implementation. It is also skeptical of whether the large amount of resources allocated and to be spent within a set timeframe could be used in an efficient and cost-effective manner (Wen Wei Po, 10 September 1998).

Although school heads and teachers generally accept that the promotion of IT in education as appropriate in meeting the needs and prevalent values of society, their readiness to implement the proposed measures varied considerably due to the heterogeneity of teachers, the large number and diversity of government-funded schools. Similar to the evaluation by Bigum and Kenway (1998) of the main standpoints that educators take towards new technologies in education, there are what they called 'boosters' and 'critics' amongst Hong Kong teachers. Despite the variations in terms of acceptability amongst teachers, they are more unanimous in their general perception towards the low 'responsiveness' of the Strategy. According to the media reports and surveys conducted by various organizations, it is noted that quite a number of them regarded the Strategy as not responsive enough in catering for their psychological needs and concerns in adjustment. Furthermore, the flexibility allowed in the delivery of computers and related equipment to match the particular circumstances of schools casts doubt on the 'equity' criterion. Usually the 'better-off' schools will have a comparative advantage in getting other technical support and training places for teachers. Another concern relating to equity is the observation supported by research that students from wealthier families are more likely to have computers and other technology resources at home than those from poorer families (Roblyer et. al., 1997: 43). The discrepancy in educational advantages and disadvantages of students from different socio-economic background may be aggravated with the growing use of IT and its integration into the curriculum.

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[1] Pelgrum and Plomp (1993) quoted Hawkridge's (1990) summarization of four rationales for introducing IT in education: social, vocational, pedagogical and catalytic (to accelerate other educational innovations).

(c) Financial Feasibility - Since the Strategy has been able to meet the two important criteria of 'appropriateness' and 'acceptability' in the political viability test, it can readily secure the necessary funding from the government. The implementation of the Five-Year Plan involves a capital cost of $2,580 million and a recurrent cost of $233 million per year. An annual recurrent grant ranging from $69,000 to $76,000 is also provided to schools depending on their size for the purchase of consumables, educational software packages and other ancillary items. Although the current allocated funding seems to be sufficient to provide a 'threshold level' of hardware to schools, training for teachers and the necessary infrastructural support, it is doubtful whether schools have the financial capacity to maintain and update software and IT facilities. In view of the fact that the present estimated required funding is mainly based on the quantifiable aspects while the less measurable components have not been adequately dealt with in the Strategy, there are concerns as to whether future financial support will be as sufficient and as readily available. To implement IT in education, it is always difficult to assess how much funding would be adequate given its expensive and fast-changing nature, and the need for maintenance.

(d) Administrative Operability – In the case of the Five-Year Strategy, the capability of existing administrative and delivery systems has facilitated its smooth implementation. There is clear authority for the Education Department to request co-operation from schools and teachers, and resources to procure equipment and recruit technical staff. In terms of institutional commitment, it is relatively straightforward for officials of Education Department to discharge their assigned tasks and to make the necessary provisions as laid down in the Strategy. But for schools heads and teachers, their commitment may be less certain since the policy requires fundamental changes in their behaviour and working style. Apart from the provision of training, to facilitate commitment and willingness of teachers in using IT would require other supporting conditions such as exposure of teachers to the potential functions and benefits of IT, availability of local educational software, technical support, including time and resources for preparation of teaching material. With regard to organizational support, the educational authorities have not provided sufficient assistance to schools in dealing with problems of insufficient space and installation difficulties due to constraints in physical setting.

CONCLUSION AND RECOMMENDATION

From the evaluation of the Five-Year Strategy, it can be seen that an effective policy to promote IT in education requires several conditions to meet the four sets of evaluative criteria. Although it is recognized that IT has a growing importance in the present rapidly changing world and knowledge society, we should be cautious of a blind faith that IT can necessarily serve our education needs better. Since education involves human interaction and even vocational education is increasingly expected to train personnel or technicians with multi-skills, more attention should be given to the human and cultural dimensions in applying IT in education. What can be learned from the Five-Year Strategy is that policy makers need to have a clear understanding of the user context to develop their learning faculties, the underlying rationale for integrating IT into the curriculum, as well as the personal and professional needs of teachers. In addition, they also need to be sensitive to the organizational and institutional culture of agencies responsible for implementing IT in education, and the specific nature and requirements of different vocational training programmes.

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Wen Wei Po, 10 September 1998.

CROSS DISCIPLINARY CONTINUING PROFESSIONAL DEVELOPMENT

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Index: Cross Disciplinary Training, Continuing Professional Development

Abstract: The author examined the continuing professional development programmes of the banking and legal professions. He found that, in the years under study, each profession offered a substantial number of training courses that fell within the discipline of the other. There was significant mutuality of training need in the two professions. He concluded that trainers as well as educationalists should, in future, pay more attention to cross disciplinary training and education, especially where Hong Kong harbors the ambition of evolving into a knowledge based society.

INTRODUCTION

In this paper the author uses the Continuing Professional Development (CPD) schemes in the legal and banking professions to illustrate the issue of "Cross-disciplinary Continuing Professional Development". The term here means "that professionals from one discipline acquire in-depth knowledge as well as the modus operandi of another profession in order to enhance their personal value and make contribution to their own discipline"[1].

The author selects the legal and banking professions for analysis for three reasons.

a. The new recruits

In the legal profession, practicing members are required to possess narrowly focused qualifications. They are usually in the form of a first degree in laws (LLB) together with a Professional Certificate in Laws (PCLL). In the case of legal executives, they are usually required to possess a qualification relating to legal studies at the Higher Diploma level. Clerical workers in the legal profession are not required to possess formal law qualifications. They, however, are not permitted to give advice to clients, or engage in court work, or undertake professional activities unless strictly supervised.

Banking professionals have a vastly different profile than legal professionals. Banks offer employment to people from all walks of life. Bank officers may come with a background in science, engineering, business as well as law. Traditionally banks would take up the responsibility of training their young executives in banking and finance who, at a latter stage, may take over the helm of the company. This is, to a certain extent, still true, but most banks now rely on the tertiary sector to supply them with young men and women who are already well versed in the finance discipline.

b. The changing professions

The legal profession in Hong Kong has undergone significant changes in the past few years. A few years ago the Law Society permitted its members to freely negotiate fees with their clients in conveyancing work. Since then, to the dismay of many solicitors, fees relating to conveyancing practices have taken a nosedive. Many firms have fallen on hard times. Young solicitors, who only possess legal skills, are experiencing difficulties in securing suitable employment in the profession. The barrister side of the legal profession has fared better because the volume of court work in civil matters has stayed relatively stable. However, it is said that senior members of the bar are increasingly taking up work which was previously relinquished to members of the junior bar.

A few years ago the Law Society deregulated the marketing of legal services by its members. Solicitors are now permitted to do limited marketing of their legal services. Overseas, in the UK, solicitors first advertised their services during the early 1980s[ii]. As a result, UK Personal injury lawyers, or claims negotiators, are said to be selling their services in a rather direct and vulgar fashion. It is reported, no doubt unfairly, that UK solicitor firms display their advertisements among escort agencies and loan sharks in local newspapers[iii]. Advertisement of this nature has not yet appeared in the Hong Kong media although there was a case of a solicitor exhibiting his unclad body in a local magazine, holding a law book next to him. Barristers in Hong Kong seem to be holding their ground on the advertising issue. At a general meeting of the Bar Association, the majority of its member voted down the proposal of allowing barristers to advertise[iv].

There is already a bill in the Legislative council increasing the District Courts' civil jurisdiction, from the present HK$120,000 to a new ceiling of HK$600,000. Solicitors have the right of audience in the District Courts and limited practicing right in the High Courts. It means that solicitors will, in future, take up civil cases which previously were the exclusive domain of barristers. With increasing competition from solicitors, the issue of barrister marketing will, no doubt, again be raised in the future.

In the banking sector recent changes are abundant, to say the least. The proliferation of internet services to the general public has put a lot of pressure on banks to offer web-based banking. Market leaders, such as the HSBC group, have already announced its plan to launch web-banking in the year 2000. Bank of China group, after the impending merger of its 12 sister banks, would have to follow closely if it wants to remain competitive.

On the profitability side, banks are now engaged in a heated mortgage war despite the displeasure of the Hong Kong Monetary Authority (HKMA). The profitability of banks would suffer if this "war" goes on. The most recent mortgage interest rate offer by Standard and Chartered Bank is one percent below the prime rate for new mortgages as well as re-mortgage of domestic property. Anticipating challenging and possibly difficult time ahead for locally incorporated banks, Mr. Joseph Yam, CEO of HKMA, delivered to local bankers a strong message in the Hong Kong Institute of Bankers' Millennium Dinner[v]. Mr. Yam urged banks in Hong Kong to entertain seriously the idea of merging with each other in order to remain competitive.

THE CONTINUING PROFESSIONAL DEVELOPMENT SCHEMES (CPD)

To meet the changing needs of their professions both the Law Society and the Hong Kong Institute of Bankers (HKIB) offer continuing professional development schemes. The Law society has made the CPD scheme mandatory for all solicitors admitted after 1991. Solicitors who fall within this category are required to accumulate a minimum of 15 CPD points each year before they apply for their next year practicing certificates. As a rule of thumb, each CPD point entails a participant to take part in a one-hour learning session.

The CPD courses offered by Law Society are indicative of the continuing and changing needs of the profession. The author has made a review of CPD courses offered by the Law Society during the year 1999[vi]. Of the 155 courses offered, 25 are finance related, 15 are business related excluding those relating to finance. In 1999, a total of 40 (25%) courses offered by Law Society were not law related. The number of non-law courses offered has indicated the needs of the legal professionals to acquire out-of-discipline knowledge and skills. Twenty-five out of the 40 out-of-discipline courses are finance related. This raises the issue of multi or dual discipline training/education.

One of the mandates of the HKIB is to offer training to banking professionals in Hong Kong for meeting their continuing professional development needs. It runs a CPD scheme similar to that of the Law Society. As HKIB is not legally empowered to grant practicing licenses to its members, its scheme must be on a voluntary basis. Besides holding its traditional professional examinations the HKIB also offer ad-hoc training courses fulfilling the needs of its members. In 1998 it organized 34 courses and seminars for its members[vii]. Out of these 34 courses and seminars, 11 related to the legal discipline, 3 related to china business, 2 related to general issues of the economy, 2 related to investments, 7 related to bank lending, and 9 related to the dual discipline of law and lending. Others are on general issues.

CONCLUSION

After the foregoing analysis the author finds that:

a. A significant proportion of the CPD courses offered by the Law Society are not law related nor dominantly law related. Forty out of the 155 courses offered are business related. Of these 40 courses, 25 are finance related.

b. A significant proportion CPD courses offered by the HKIB are not banking related. Eleven out of the 34 course offered were law related. Out of the 16 lending related courses the author finds that 9 are law related (for example, Legal Issues of Loans Recovery).

The author concludes that cross-disciplinary CPD schemes are a fact of life in the legal and banking professions. He is of the further view that the observed phenomenon may not be confined to the two professions under study. This phenomenon may be found in all generically related professions, and in some unrelated professions. He recommends that formal education in the tertiary sector should take note of this need and provide educational services accordingly, in the form of cross-disciplinary programmes in the full-time and part-time modes.

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[ii] Feature article, "Marketing meets the Law", *Marketing Business, p.22, Dec./January 2000.*

[iii] Ibid, p.24.

[iv] 23.1.2000, South China Morning Post.

[v] HKIB hosted the dinner on 9th December, 1999, in Hong Kong Sheraton Hotel. Mr. Joseph Yam was the key speaker of the occasion, and his speech was widely reported by the local press.

[vi] Law Society also accredits courses offered by outsiders.

[vii] The 1999 summary is not yet available. The 1998 summary is adequate for the purpose of this paper.

ATTITUDES OF UNIVERSITY FACULTY MEMBERS TOWARD STUDENTS WITH DISABILITIES

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Index: Special Needs; Educational Opportunity; Social Responsibility

Abstract: American colleges and universities are experiencing a continuous enrollment of students with disabilities, especially students with learning disabilities. The Americans with Disabilities Act mandates that institutions of higher education provide full accommodations and services to all students. This study was conducted to ascertain the attitudes of university faculty members toward serving students with disabilities. Seventy-one faculty members representing three broad academic areas in a university in the Southeastern Region of the United States participated in this study. Results of the data analysis revealed statistically significant differences existed between faculty members when they were grouped by academic rank and academic unit.

INTRODUCTION

A study by Fichten, Amsel, Bourdon, and Creti (1988) found that although professors are experts in their respective disciplines, most do not feel they are experts in adapting their courses to students with disabilities. Leyser (1989) found that a large majority of faculty supported the integration of students with physical and sensory disabilities; however, they were less supportive of students with learning disabilities and emotional disabilities. The Leyser study also found that less than one half of the 124 faculty members surveyed were using the resources and support services available to assist students with disabilities.

The removal of architectural barriers on college campuses has been a primary goal of most institutions. However, as Newman (1976) stated: ". . . the barriers to accessibility on college campuses to the handicapped are not only physical . . . attitudinal barriers are at least as salient." Nathanson (1982) reported that faculty attitudes and perceptions are influenced by the amount of contact they have with students with disabilities. Nathanson found that faculty emotions, perceptions, assumptions, beliefs, and expectations all play an integral part in the faculty and student relationship. Jarrow (1987) reported that research evidence indicates that attitudinal barriers are as much a matter of what we say as they are a matter of what we do; but given appropriate support, students with disabilities can be successful in pursuing a postsecondary education.

The increased number of students with disabilities who are being served in higher education and the demands of this population make it imperative that university faculty members be prepared to serve these individuals effectively. Students with disabilities need the assistance provided by a disability services office as well as accommodations in the classroom. Faculty members within each institution of higher education have a legal responsibility to provide accommodations to qualified students with disabilities. An assessment of the current attitudes of faculty members may be helpful in planning, designing, and implementing professional development programs to prepare faculty to serve students with disabilities effectively and efficiently in the regular classroom.

Statement of the Research Problem

Students with disabilities face many of the same challenges as other students as they pursue their college studies. Some students are concerned about the lack of awareness of their unique requirements by college and university faculty members. Attitudinal barriers should not be ignored when striving to provide equal access to higher education for students with disabilities. The attitudes of university faculty members may be a significant determinant in the successful completion of educational experiences for students, with or without disabilities. The lack of information related to the attitudes of university faculty toward serving students with disabilities provided the focal point for this research.

Purpose of the Study

A review of the literature revealed no studies have been completed related to the attitudes of faculty members at small, regional public teaching institutions. The purpose of this study was to investigate the attitudes of faculty members toward serving students with disabilities at a small, regional university in the southeastern region of the United States. Attitudes were examined in relation to selected demographic variables of faculty members.

Research Question

The following research question served to guide this study.

To what extent is there a difference in attitudes of university faculty toward serving students with disabilities as measured by the Survey of Faculty Attitudes Relative to Serving Students with Disabilities questionnaire when faculty are grouped by (a) gender, (b) age, (c) academic rank, (d) academic unit, (e) years of teaching experience, and (f) extent of contact with students with disabilities?

Definition of Terms

Auxiliary aids and services—the term, "auxiliary aids and services," includes (a) qualified interpreters or other effective methods of making aurally delivered materials available to individuals with hearing impairments, (b) qualified readers, taped texts, or other effective methods of making visually delivered materials available to individuals with visual impairments, (c) acquisition or modification of equipment or devices, and (d) other similar services and actions (Americans with Disabilities Act, 1990).

Disability—the term, "disability," means, with respect to an individual: (a) a physical or mental impairment that substantially limits one or more of the major life activities of such individual, (b) a record of such an impairment, or (c) being regarded as having such an impairment (Americans with Disabilities Act, 1990).

Reasonable accommodation—the term, "reasonable accommodation," may include making existing facilities readily accessible and usable by individuals with disabilities (Americans with Disabilities Act, 1990).

Limitations of the Study

1. Only faculty members employed in one small, regional university in the southeastern region of the United States were included in this study.
2. Results were limited to the extent that faculty members responded with their honest feelings.
3. Results were limited to the extent that the research instrument measured the true feelings of the faculty members.
4. A non-response bias may have existed in the non-return rate.

Assumptions of the study

1. Responses to items on the research instrument indicated the true feelings of faculty members.
2. Faculty members had some previous knowledge of the rights of students with disabilities according to legislative mandates.
3. Faculty members had some previous experience interacting with a student with a disability in a classroom setting.
4. The survey instrument was sensitive to faculty attitudinal characteristics.

METHODS AND PROCEDURES

Sources of Data and Collection Procedures

The research instrument and demographic data form were administered to all 106 faculty members employed at a small, regional teaching university in the southeastern region of the United States. Useable data were collected from 32 full-time faculty members and 39 adjunct faculty members. The number of males and females were almost evenly divided, with 35 males and 36 females. The researcher administered the survey instrument and a demographic data sheet in January 1999 to the faculty during a faculty convocation session. Faculty members completed the demographic data sheet and the survey instrument during the convocation session.

Instrumentation

The Survey of Faculty Attitudes Relative to Serving Students with Disabilities instrument was used for this study. This is a 30-item instrument to which participants responded using a Likert-type scale with a range from 5 for "Strongly Agree," to 1 for "Strongly Disagree." Some items are written with positive connotations and some with negative connotations. Sample items include statements such as, "Inclusion of students with disabilities will require significant changes in classroom procedures" and "Inclusion of students with disabilities will necessitate extensive retraining of faculty." A score could range from 30 to 150, with a higher score indicating a more favorable attitude toward students with disabilities.

Procedures for Data Analysis

Data were analyzed using the Statistical Packet for the Social Sciences (SPSS). A one-way analysis of variance statistical procedure (ANOVA) was used to test for differences in mean scores between groups for each of the six independent variables. The .05 level of significance was used. Differences in mean scores were tested between groups when data were grouped as follows: (a) gender, (b) age, (c) academic rank, (d) academic unit, (e) number of years of teaching experience, and (f) extent of contact with students with disabilities. Minimum and maximum scores, mean scores, and standard deviations were computed for the demographic data.

Results

No statistically significant differences were found for the following variables: (a) gender, (b) age, (c) years of teaching experience, or (d) previous contact with students with disabilities.

The F-ratio of 4.138 indicated statistically significant differences between mean scores for academic rank. Faculty members who did not hold academic rank (instructor and adjunct) had higher mean scores (Mean Score=86.69; SD=6.19) than faculty members who held academic rank (Mean Score=83.50; SD=6.80). The lowest score for the non-academic ranked faculty was 77 and the highest score was 105, whereas the lowest score for faculty who held academic rank was 71 and the highest score was 98.

The F-ratio of 4.337 indicated statistically significant differences between mean scores for academic unit. The mean score for the College of Arts and Sciences (Mean Score=88.16; SD=7.94) was higher than the mean scores for the School of Business (Mean Score=84.48; SD=5.11) and the School of Education (Mean Score=82.96; SD=5.17).

The mean score for all participants was 85.30 with a standard deviation of 6.61. The minimum score for all participants was 71 and the maximum score was 105.

CONCLUSIONS

Overall, faculty members held generally positive attitudes toward serving students with disabilities; however, academic rank and academic units were indicated as statistically significant variables related to faculty attitudes. It appeared that faculty members who did not hold academic rank had more positive attitudes toward serving students with disabilities than faculty members who held academic rank. In addition, faculty members in the College of Arts and Sciences appeared to have more positive attitudes than faculty members in the School of Business and the School of Education. Results of this study suggested that the attitudes of faculty members in this study were similar to faculty attitudes reported in similar studies at other higher education institutions (Fonosch & Schwab, 1981; Schoen, Uysal, & McDonald, 1987). In the Fonosch and Schwab study, results indicated that most faculty members held positive attitudes toward students with disabilities. Faculty members who used more than the lecture method had more positive attitudes toward serving students with disabilities than those who used the lecture method only. Schoen et al. reported that faculty members generally held positive attitudes toward students with disabilities in relation to classroom management issues and compliance with legislative mandates.

Faculty members in the School of Education held the least positive attitudes of serving students with disabilities. This may have been due to the professional stress these faculty members have experienced in recent years. For example, changes in university leadership, increased use of technology, changes in curricula, transition requirements from the quarter to semester system, renewal of accreditation, and lack of faculty input for many of the changes. The combination of countless changes may have taken away some of the concern normally shown to students. In addition, faculty members with academic rank may have answered more frankly due to the fact that they typically are tenured and may feel more secure than their non-ranked, non-tenure track counterparts. Many students transfer into the university from two-year postsecondary institutions; therefore, faculty members who do not hold academic rank may have limited contact with these students due to the fact that they usually teach entry-level courses.

Finally, faculty members in the School of Education may have indicated the least positive attitudes due to doubts that they may have relative to the ability of students with disabilities to master new material and to use assistive technology effectively.

RECOMMENDATIONS

Data for this study included faculty members at only one small, regional university campus; therefore, caution should be taken in generalizing the results beyond institutions similar to the one in this study. Additional research could be conducted at other similar universities to provide a larger data base. A larger data data base may provide a more comprehensive view of faculty attitudes.

Nathanson (1982) suggested that the attitudes of college faculty might have a profound impact on the educational and social integration of students with disabilities. Fichen, Goodrick, Tagalakis, Amsel, and Libman (1990) suggested that faculty attitudes might translate into behaviors that could either facilitate or impede the college experience for students with disabilities.

Additional research may be helpful in assessing the professional development needs of university faculty toward serving students with disabilities. For example, special training programs may help faculty members to increase their knowledge relative to the nature of various disabilities and appropriate accommodations, compliance with legislative mandates, and the use and incorporation of assistive technology into their instructional programs.

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MOBILITY, FLEXIBILITY AND ACCESSIBILITY OF POST-SECONDARY EDUCATION IN HONG KONG

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Index: Accessibility, flexibility, higher, vocational, continuing, education

Abstract: In its recent consultative document, the Education Commission recommended that, through portable and transferable credits, learners' achievements attained through different channels are recognized.

However, this paper argues that:

- Increasing participation should not be viewed as equivalent to widening participation.
- The distinction between continuing education and higher education becomes blurred.

The paper concludes that the policy on lifelong learning seems to have been shaped by two factors economic and social equity. The development of these policies is part of a wider process of change – change in the higher education system, funding mechanisms, and university curricula.

INTRODUCTION: CHANGE AND LIFELONG LEARNING

Recently we often hear people saying that the world is moving towards the information age and a knowledge-based society. Issues such as how people can adapt to this shift as well as the problem of unemployment remain to be solved. However, education, in particular lifelong learning, is frequently perceived as the solution to all these problems.

Some educators and policy-makers believe that, with lifelong learning as a way of keeping people to adapt to the shift towards an information age and a knowledge-based society, there should be a scheme for credit accumulation, thus creating ladders of opportunity for people to gain qualifications. This process will emphasise student choice and student-centred learning; and, through portable and transferable credits, will allow learners to undertake study in one institution and transfer achievement/credits to another at will. This paper attempts to analyse the Education Commission of Hong Kong' policy of widening learning opportunities by facilitating credit transfer among higher education institutions in Hong Kong. In particular, it focuses on considering the merits and challenges of such a shift.

MOBILITY, FLEXIBILITY AND ACCESSIBILITY IN POST-SECONDARY EDUCATION

Countries such as the UK and Australia believe that investment in human resources and in particular, an increased participation rate in both post-school and higher education are essential in gaining competitive economic advantage (Robertson, 1996a; Gallacher et al., 1996). As such, their policy of increasing and widening access to higher education has an underlying economic agenda (Gallacher et al., 1996).

As Edwards (1993) pointed out, in a Post-Fordist framework, governments will emphasize the need for more highly skilled and multi-skilled flexible workforces if their countries are to compete in the global economy. This in turns leads to educational systems which emphasize vocationalism and flexibility, and help students to gain the kinds of education and training required for them to contribute to economic growth.

The post-secondary education system in the US is characterized by transferable credit, great flexibility and mobility, an approach which is perceived as suitable for mass rather than elite education (Robertson, 1996b). In the UK, the credit accumulation and transfer schemes (CATS) which facilitates student mobility through recognition of learning acquired from participating institutions may also be seen as a development to cater for democratic participation by large number of students (Robertson, 1996b). Hong Kong is now also moving in a similar direction (Education Commission, 2000). As part of the globalization process, the widening of access to adult learners and the practice of credit transfer in countries such as the UK, the US and Australia are influencing policy formation in Hong Kong within a much shorter time scale. However, the problem now is whether Hong Kong has changed, or will change, from elite education to mass education.

THE EDUCATION COMMISSION'S PROPOSAL

In its recent consultative paper, the Education Commission (2000) recommended that 'post-secondary learning opportunities should be increased to align with the knowledge-based society' (p. 7). It also recommended 'universities to work towards a transferable and articulated credit unit system among institutions and departments to allow students more choice of learning modules that suit their pace and learning needs (p. 42). It also suggested that 'universities give recognition to qualification conferred by community colleges' (p. 44). In other words, there should be credit transfer among universities and between universities and community colleges. This would be quite similar to the CAT schemes in the UK which allow students to break away from the traditional model where a degree is acquired by studying a particular curriculum for a set period at a single institution (Dfee, 1998).

Conceptually there are two kinds of credit transfer. One involves recognition of credits gained at a lower level of study which can then be articulated to a higher level of study which is referred to in this paper as 'vertical' transfer of credits, leading to 'upward' mobility of learners. Examples of this are the articulation of the qualifications of Project Springboard (a new programme designed for students who do not have good results in the Hong Kong Certificate of Education Examination), Community Colleges and university degree programmes. The other form of transfer involves recognition of credits gained at a particular institution by another institution at the same level of study 'horizontal' transfer of credits, leading to 'lateral' mobility of learners. An example of this is credit transfer among universities.

WHAT IS THE POLICY FOR?

Colebatch (1998) listed some elements in policy analysis, including the questions 'Who makes the policy?' and 'What is it for?'. He argues that policy-making is a game that not everyone can and does play, and that 'participation is not a neutral question; who participates in a policy issue helps to shape what the issue is' (p. 26).

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The key issue appears to be dissatisfaction with the large number of 'failures' in the school system, but this raises a variety of questions. Is there general dissatisfaction with the school system in the society? Who are those most dissatisfied? What is the nature of the dissatisfaction? Is there a need to widen learning opportunities? Who needs these new opportunities? The whole policy is based on perceived answers to the above questions of those who participate in the policy process.

Hong Kong has shifted to a knowledge based society, but this has been accompanied by an increase in unemployment rate and a high level of failure in the school system. It is against such a background that lifelong learning is advocated by the Government. McGivney (1990) identified three major factors that have shaped the policies on widening access for adult students in other countries. Of the three factors, two of them 'government's interest in its economic competitiveness' and 'social justice' can be identified as underlying factors in shaping this policy in Hong Kong. For example, the emphasis on lifelong learning for adaptation to a knowledge-based society assumes that widening learners' access to higher education can develop the economy of Hong Kong. On the other hand, the emphasis that there should be 'no failures' (Education Commission, 1999) is similar to the concern over social equity. It advocates the idea of providing a 'second chance' for those who gained relatively little from education at the school level. But, as will be discussed later, there remains the issue of whether those who fail to benefit from education at the school level are likely to benefit from continuing education.

The Government also advocates flexibility and mobility of students. However, no research has been done to find out the barriers to their learning. It has been assumed by the Government that it is simply a matter of lack of learning opportunities and inadequate flexibility and mobility. But, with the existence of the Open University of Hong Kong since 1989, is there really a lack of learning opportunities? Do the students really need these upward and lateral mobility? Without research, it is hard to justify the argument that the provision of further flexibility and mobility (both upward and lateral) will automatically cater for the needs of the students.

SOME LIKELY CONSEQUENCES OF THE IMPLEMENTATION OF THE POLICY

More market-oriented higher education

The credit transfer system will give more choice to the students who can choose his/her own path of study and mix different courses and programmes from different institutions. This will make higher education more market-oriented.

Blurring of the boundaries between higher education and continuing education

It appears that there are some discourses underlying the formulation of policies by the Hong Kong Government in the areas of education in general and in adult and continuing education in particular. These discourses are:

- Obscuring the boundary between formal secondary schooling and adult and continuing education,
- Eroding boundaries between sectors, institutions and sites of learning.

Changes in the funding system

Since there will be greater mobility of students across higher education institutions if the new policy is implemented, there are funding implications. At present, the universities are funded by the University Grant Committee (UGC) according to the number of full-time equivalent students. As students can move to other universities in their second or third year of study, the funding policy needs to be changed as well. Also, in order not to increase the public expenditure to cope with the widening of participation in higher education, there is a tendency for the Government to adopt a 'user-pay' philosophy in its higher education policy. The Education Commission (2000) stated that 'the proportion of private contribution to education is less than 10% of the total expenditure on education. This is smaller than that in many places' (p. 15).

Transferability of courses

If the universities can agree on a list of 'foundation courses' or 'general education courses', the credits of which can be mutually transferable, these courses would then be regarded as more 'transferable' or more 'marketable' than others. In the present situation in Hong Kong, these courses are more likely to be in the areas like information technology and language skills. Such a development would have an impact on shaping the boundaries of adult education and higher education.

CO-ORDINATION AND IMPLEMENTATION OF THE POLICY

Colebatch (1998) indicated that

> 'policy work takes place across organizational boundaries as well as within them, and consists in the structure of understandings and commitments among participants in different oganizations as well as the hierarchical transmission of authorized decisions within any one organization.' (p. 39)

When the philosophy or rationale adopted by the Education Commission is transmitted to the organizations which implement the policy decisions, how can one ensure that these organizations have the same degree of understanding and commitment. This is particularly significant in an area such as credit transfer as it involves consistent implementation among the institutions concerned. The problem is how to persuade the academic staff involved to acknowledge the benefits obtained as a result of the change a shift in perspective which is unlikely to be achieved by a top-down approach.

ALL ROADS LEADING TO UNIVERSITY EDUCATION?

Can credit transfer enhance social access, participation and equity? There may be new barriers created by the Education Commission's proposal. For example, the programmes in the Community Colleges are, at least to a great extent, self-financed, thus disadvantaging those with limited financial resources.

The notion that learning opportunities has been widened by the policy is more complex that it appears at first to be. At present, 18% of the school leavers can enter the first year of university. If this provision is not going to be changed, it is only a matter who gets the places. As far as sub-degree programmes are concerned, many opportunities already exist in Hong Kong, including the various certificate and diploma courses offered in some universities and their Continuing Education Units as well as the Vocational Training Council. There is already intense competition among the providers for a limited pool of students, so the introduction of Community Colleges and the arrangement for articulation of their programmes to degree programmes cannot be seen as a step towards the widening of opportunities for learners.

Another related issue is that the relative proportions of Associate Degree graduates of these community colleges entering the employment market as against entering universities is not yet known. However, Tight (1993, p. 66) argued that 'the prospect of obtaining a degree is used as a major, and usually *the* major, selling point in the marketing of access courses.'

Increasing participation should not be viewed as equivalent to widening participation. Implementation of the policy of credit transfer can result in the former without necessarily leading to the latter. It may be the same group of learners (probably the advantaged group) who can climb up the ladder under the system. In other words, those who can successfully get the certificates will go on for a diploma and finally a degree programme.

SOCIOLOGICAL PERSPECTIVES: ECONOMIC GROWTH VS SOCIAL EQUALITY

The Education Commission espouses the advantages of widening access to learners and credit transfer among other higher education institutions as if it was a new concept in Hong Kong. But one cannot overlook the fact that the Open University of Hong Kong has put this concept into practice and implemented a policy of open access and credit transfer for ten years.

Open education philosophy derives from a 'democratic' view of education – education that is accessible to all students regardless of social origin (Gallacher, 1996). Robertson (1996a) described two different perceptions of the role of universities in society from two sociological positions: right-wing governments see universities as engines of economic growth while the left-wing governments view them as agents of social equality. One may use this distinction in ideology (economic growth vs social equality) as an analytical tool to analyse the Hong Kong Government's views on higher education, in particular the policy of establishing a comprehensive mechanism for qualifications to be freely transferable.

It is debatable whether the Hong Kong Government views higher education essentially from an 'economic growth' or 'social equality' perspective. On the surface, it would like to increase the flexibility of students' learning paths. But research in the UK (Dfee,1998; NIACE, 1997) has indicated that students who are not successful in their formal education are also less likely to benefit from other forms of adult and continuing education, especially those leading to qualifications. Also, the fact that a substantial proportion of the population is denied access to higher education results from a combination of low motivation to learn and inadequate supply of places. However, the underlying assumption in the policy document is that only the latter needs to be considered. That is, the Government assumes that students wish to study but have been deprived of opportunities in the past. Is this really the case? Therefore, the Government's intention – to solve problems arising from formal secondary school education by continuing education may not work as it wishes.

CONCLUSION

The policy on lifelong learning proposed by the Education Commission seems to have been shaped by two factors economic and social equity factors. However, it appears that the former is the main concern of the Government, with the latter serving only a rhetorical role. Similar to developments in other countries (Robertson, 1996b, Commission of Social Justice, 1996), the intention of the Government to widen access to higher education is also a shift from elite education to democratic mass participation. Credit transfer, in particular where it leads to upward mobility of learners, is one of the means to achieve these ends. But, as the Commission of Social Justice (1996) pointed out, 'if standards are to be maintained, more students mean more resources' (p. 196). Although the Education Commission consultative document has clearly indicated its wish to increase the postsecondary learning opportunities, it has neither proposed an increase in funding in the sector, nor an increase in degree places. Therefore, the credit transfer system alone will not genuinely increase the learning opportunities in society. It is a matter of who gets the places.

The policy, driven by underlying economic agendas, will be far reaching and the process of change will continue to shape higher education and continuing education in Hong Kong. How can those under-skilled workers and failures in the secondary schools adapt in a society claimed to have changed to a knowledge-based one? Can the new policy help them? In all these approaches to change, the emphasis on access to higher education will be associated with a growing concern with vocationalism. The development of these policies must be seen as part of a wider process of change – change in the higher education system, funding mechanisms, university curricula and role of higher education in society.

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VOCATIONAL EDUCATION IN ENGINEERING IN THE INFORMATION AGE

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Index: Course Development, Partnership, Vocational Education, IT.

Abstract: Learning new skills or acquiring new knowledge is becoming part of life for most adults. Indeed, the paradigm of life-long learning has found advocates not only in individuals but also policy-makers. In the information age, life-long learning will be increasingly dependent on the successful application of information and communication technology. This paper outlines recent curriculum developments of this department, highlighting information technology applications for course delivery and management. In catering for the changing needs of local industry, the department seeks to establish partnership with local companies, aiming to expand the department's scope on life-long learning provision at the same time.

INTRODUCTION

Over the past few decades, Hong Kong has transformed itself from a labour-intensive to a service economy. Now, the economy is heading towards a knowledge-based one where intellectual capital takes center stage. Increasingly, employers expect their workforce to be multi-skilled and their employees to have cerebral skills over manual skills. The economic landscape is changing rapidly. In response to these changes, the Hong Kong SAR government is keen to foster a strong life-long learning culture in society, such that the workforce would keep on learning and upgrading their skills and knowledge in order to compete in the global market. As put forward in the 1998 policy address, the government has in fact envisioned Hong Kong becoming a learning society.

To enhance employability, according to a recent survey, 85% of the respondents perceived qualification as a major factor. At present, there are over 300,000 people, some 10% of the working population, receiving continuing education at the higher education level. In satisfying such a demand for self-advancement, there are more than 150 overseas academic and professional institutions, offering over 500 programmes for local consumption. Yet, there are over 700,000 workers, who are over 40, with formal education no higher than Form 3. Based on figures available in year 2000 first quarter, the unemployment rate for this age group was about 6.9%, which was higher than the overall rate of 6.1%. Of even greater concern was the high unemployment rate amongst youths: for the 15-19 age group, it was about 29%. Vocational education providers should therefore seek to offer more opportunities for these two groups, which are particularly vulnerable to future economic changes.

In the information age, e-class room is emerging, making use of information technology(IT), such as video-conferencing, streaming video, and networked PC or the internet for education and training delivery. It offers greater flexibility to learners, overcoming constraints imposed by geography or time. In a city like Hong Kong, where many work irregular hours or travel frequently, learning and self-improvement through IT is a very attractive option. In fact, similar to experience overseas, for instance Edling (2000) and Fayter (1998), many local tertiary institutions are experimenting with the idea of virtual university. Feedback so far has been positive both from students and lecturers. On the whole, the use of IT has shown to greatly enhance traditional methods, adding flexibility, variety, and convenience to service delivery. Obviously, there are negative effects too, in particular, the lack of human contacts. Nonetheless, with 30% of the population using the internet, especially amongst younger population, the use of IT for teaching and learning must be carefully developed such that wider distribution of knowledge can be achieved at lower costs.

COURSE DEVELOPMENT

The existing courses of this department serve a large cross-section of the community, ranging from young secondary school-leavers of Form 5 or 7 standards, mainly for full-time programmes, to those who are in their late 30's working in the industry taking part-time programmes. By and large, their educational needs are satisfied by a common academic programme, which is comprehensively covered by the department's suites of courses. The development of these suites of courses has been based on many factors, for instance, the need for such courses, the provision of similar courses in Hong Kong and the career prospects for graduates. In addition, efforts have been made to design courses of high academic standards with well-integrated engineering application materials. The aims of our courses are to produce engineering professionals who have a broad based understanding of engineering science and at the same time, develop trade skills which meet the needs of the employers. Bearing in mind the vocational character of these courses, it should be stressed that graduates should have an in-depth knowledge of installation, testing, commissioning, operation and maintenance of systems as well as a good understanding of the application of modern digital electronic control.

These course aims are achieved initially through a curriculum structure that is based on a very well established classical programme. This programme includes theoretical core subjects and more importantly extensive practical training. With the development and expansion of the information technology, current syllabuses now rely heavily on the applications of computers in the process of teaching and learning. Computer application includes interactive communication and simulation of processes and systems which are extremely useful tool to assist learning.

The courses to be offered in the future by this department will extend beyond traditional market segments. In addition to offering courses that award academic qualifications, the department will expand its range of courses gearing towards professional qualifications. For the graduates of these courses (including the academic and the professional ones), the department will design and offer many continuing development programmes to help them keeping abreast with the developments in their own fields. On the other hand, attention will increasingly be given to satisfying the needs for self-advancement and continuing education of the growing population who are without the necessary knowledge and skills for the changing needs of the economy. In those cases, the format and content of the programmes will be designed to suit the academic background of potential students and prevailing economic enviroment. Short courses, training programmes, skills-based workshops will be offered and supported at every possible instance by the application of the information technology. These courses will be designed and developed in close co-operation with external organisations such as government agencies, academic institutions and the industrial sector.

IT APPLICATIONS

Recognizing the importance of information technology in vocational education, the VTC has recently launched an extensive programme to upgrade the computer infrastructure to provide the necessary support to teaching departments for course delivery and management. The department is now in pursuit of making the necessary changes to make the best use of this technology in our teaching and learning programmes, course management and related activities.

As a first step, teaching and learning materials are revised and prepared in electronic format, including lecture notes, tutorials and laboratory instructions, PowerPoint and web-based presentations etc. The teaching and learning materials are uploaded into a departmental server to provide a common module delivery file (MDF), which can be accessed by staff and students in different campuses. The arrangement is found effective as quality and consistency could be ensured. Students have benefited too as they could refer to the teaching and learning materials at their own pace and time to suit their learning pattern and ability. Staff members are also able to update or supplement additional teaching materials to suit the learning pattern of the students accordingly.

The second phase of implementation is to employ an IT platform for course management and effective communications with the students via the network. The department is in the process of adopting the WebCT for this purpose. It is anticipated that with the use of this software, more interactive and programmed learning could be achieved including on-line exercises, quizzes, discussion forums, student feedback etc. Staff members will be able to monitor the progress of individual students more closely and at the same time keep track of the in-course assessments more efficiently. The third phase of development involves extensive use of multimedia to enhance the teaching and learning materials. This is particularly useful and important for the type of students taking these courses, who are in general less academically inclined. With the use of multimedia presentations, involving animation and simulation in the course-wares whereever possible, students will have a much better understanding and interest in the learning process.

The use of IT for continuous professional development (CPD) is another top priority of this department. With the help of outside Internet providers, CPD could be effectively delivered to a much wider audience particularly for engineering professionals, due to their work nature and geographic location, who might have difficulties following a rigid time scheduled learning programme. Offering Internet or web-based CPD programme is definitely an excellent alternative.

PARTNERSHIP WITH INDUSTRY

To enhance vocational education, an important consideration must be given to establish a close relationship with industry. The department has in the past appointed industrial advisers to sit on advisory committees on different levels of course management. Additional input is also obtained through surveys, course validation, industrial visits and student projects etc. The commitments between academic institutes and industrial companies are usually rather lukewarm if not superficial, possibly due to a lack of interest or resources. At the least, as pointed out in Sargeant et al (1997), such a perception of an academic/industry gap should be narrowed.

To be able to respond to the fast changing competitive international market and new technology, there is now a much greater need for academic institutes and the industry to have a closer cooperation. To begin with, the local industry should be actively involved in designing the course curriculum particularly to match and to meet the industrial requirements in terms of knowledge, skills and relevance. Secondly, the industry should help to provide support for staff and student training, preferably also involved in the running of the courses. In this respect, staff and students will be able to focus the teaching and learning more towards the industrial environment and hence improve the employment prospects of our students. It is therefore logical for academic institutes to form partnership with industrial corporations, seeking mutual support and to share resources, which can be beneficial to both parties.

An example to illustrate the benefit of such industrial partnership could be demonstrated with the department's CAD/CAE Centre. The Centre is now equipped with the most advanced software packages for Computer Aided Design and Computer Aided Engineering. It is supported by local industry from software suppliers and from industrial companies with the need of such technology. It is therefore logical to establish a partnership with these local companies to promote activities that are mutually beneficial to the department and the local industry. Industrial corporations wishing to participate are encouraged to set up their design office either physically or virtually with the department. A joint design office or centre is ideally set up to meet both the needs of the industry and the training requirement of our students possibly with shared resources and expertise. This will then help the department and the industrial companies to save on expensive software and hardware and at the same time to ensure that the department is equipped with the most appropriate design tools as required by industry standards. Alternatively design tools and technical information could also be made available in a virtual space in a PC server, which could be accessed by both parties. Such arrangements would help staff and students to have the opportunity to engage in a realistic engineering environment and to get involved directly with industrial projects. However, staff and students involvement in industrial projects of this nature must be recognized as part of their curriculum and course work. Their contribution should be credited as part of the teaching and learning exercise.

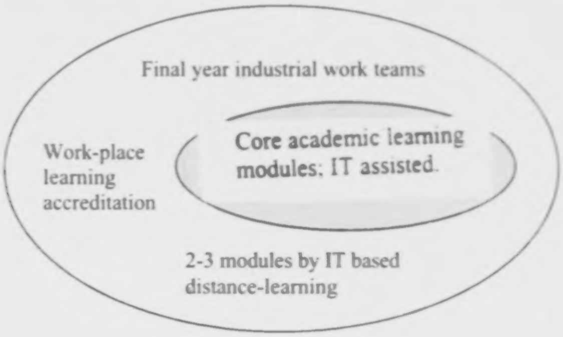
Another area of cooperation could be in the form of engineering knowledge database and CPD programmes. In an information age, knowledge database is vitally important to engineering professionals not only to deal with routine work but also to update on the latest development of technology. With the advent of Internet, there is great incentive for academics as well as industrial corporations to jointly establish such a facility to share technical information and to promote professional activities using web sites. It is feasible and desirable to setup a database as part of an Internet portal to provide a wider access to the engineering community. The department is therefore currently working with an Internet incubator venture company to provide Internet portal for the disciplines in Maritime Technology, Building Services, Environment and Safety. The web sites are also intended for web based CPD programmes for life-long learning.

An Emerging Model

It is apparent from the preceding sections that to respond swiftly to market changes, the existing approach needs to operate differently and in particular, it should take advantage of IT. Industry or employers must be prepared to provide greater input, whilst a good balance of academic learning has to be kept. To develop the idea further, the boundary between academic institutions and the world of work would need to become more fluid and dynamic. It could be proposed further that an interface would be introduced in the final year of all courses, where project work with companies becomes the norm, whereby a lecturer/trainer would act as facilitator and lead students to solve problems for companies. It could also take the form of research and development for small firms, testing of equipment or system design. This would not only simulate the real work place, as it is the real work place. At the same time other qualities such as team work, communication and interpersonal skills development could be blended in too. The learning experience will not only be greatly enhanced, but also aligning to industrial needs.

In terms of IT application, it is to assist learning in core levels, then it is geared for distance-learning in the final year, where great flexibility to academic learning prepares for self-learning in the future. IT would also be used heavily for course administration in keeping track of progress of the diverse range of activities. A framework for this is depicted in Figure 1. To take advantage of this model further, a mechanism for accrediting work place learning should also be explored, for instance Wills(2000) offers some initial thoughts. As tomorrow's companies evolve, there would be a call for further innovation from vocational education providers. To nurture an innovative culture in a highly regulated sector, service providers could start experimenting with new ideas in continuing education, which could take on many new forms that are discussed by Davis(1998). To be successful, another factor cannot be overlooked: a "national" accreditation/qualification scheme must be in place such that greater participation from potential learners would be assured of a nominal return at the least.

Figure 1: A conceptual framework for vocational education in engineering


Final year industrial work teams
Work-place learning accreditation
Core academic learning modules: IT assisted.
2-3 modules by IT based distance-learning

QUALITY ISSUES

Quality of teaching and quality assurance in further or higher education are complex issues even in the existing classical educational environment characterised by a structured, static and classroom format. These issues become much more complex due to the need to closely follow the rapid changes in engineering technology and in particular the explosive development of the information technology as an important teaching/learning tool.

In general, teaching staff should satisfy the requirements for academic qualifications in given area of specialism and also the increasing demands for appropriate academic/practical knowledge in teaching. In addition, the teaching staff in vocational education should have a very good and up-dated practical experience and knowledge in their own engineering field.

Furthermore, in the information age, lecturers must quickly acquire a good knowledge of IT and skills for its application. Lecturers need these capabilities in order to prepare modern sophisticated learning packages, deliver their teaching materials by the new means, interact and communicate effectively with their students and peers through the new medium, assess and follow student performance on-line, administer and manage the courses and regularly participate in life-long learning for their own continuous professional development. Their IT competency will no doubt become another crucial factor, together with the infrastructure and other resources, in providing quality teaching in the near future.

Quality assurance is another important quality issue. The courses in operation now in the department (and the similar courses to be offered in near future) follow the established VTC quality assurance system. It includes internal validation and external accreditation. In addition, it involves quality management that provides consistency, uniformity and commonality, documented activities, monitoring and follow up. However, learning new skills and acquiring new knowledge as stages of the life-long learning process impose very big challenges not only to the design of appropriate programmes and training of capable teachers but to the design and implementation of appropriate quality assurance system as well. The need to act quickly to the changing needs of the economy/industry and the use of IT with its flexibility and variety "*is likely to require a considerable* *measure of flexibility, adaptability, responsiveness and even fluidity that may be difficult to reconcile with the regulatory and standardising pressures that accompany qualifications frameworks".*

The issue of the quality assurance framework is not an isolated concern that affects only this department. It is a "national" issue and the HKSAR will also have to address this topic including the reform of the education system and the definition of threshold achievement standards. In addition to such local quality assurance framework, input from international educational community will be bench-marked in order to provide reference for quality vocational programmes and training.

CONCLUDING REMARKS

This paper describes the efforts and aspiration of an engineering department that is proactively keeping apace with the fast changing operating environment. It seeks to move from a traditional product-oriented and supply-driven service provision to developing courses around customer requirements through partnership with employers, the key stakeholder to system output. Under this new approach, information technology is seen as an enabling tool that would greatly enhance the department's capability and service provision. A successful transformation would form a strong basis for expanding into continuing education services as life-long learning gathers momentum.

To adapt closely to the changing environment, efforts by service providers and employers alone cannot bring about transformation or even significant changes. Major stakeholders, such as policy-maker and regulatory bodies should be equally innovative in their approach, creating flexible systems that current operating environment entails if vocational education is not to lag behind technological or economic developments. In short, the main task ahead is for the department to close the academic/industry gap, adding genuine value to its stakeholders.

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THE ENGINEERING GRADUATE TRAINING SCHEME AND NEW TECHNOLOGY TRAINING SCHEME IN HONG KONG

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Abstract: If Hong Kong is to improve its competitiveness, a sustainable adequate supply of well-educated and trained manpower, particularly at the technologist level, is essential. Given the fact that human capital is the single most important factor supporting Hong Kong's development, the Hong Kong Government has been and will continue to be firmly committed to investing heavily in education and training. This paper describes the operation of two government funded schemes for training technologists in Hong Kong , namely the Engineering Graduate Training Scheme (EGTS) and the New Technology Training Scheme which are administered by the Committee on Technologist Training of the Vocational Training Council(VTC).

INTRODUCTION

The story of Hong Kong is well-known. Its change from being a small barren island, totally devoid of natural resources, to being first an entrepot and then a robust manufacturing, trading and financial centre, despite numerous political, social and economic upheavals, is well documented. What is not so well-known, however, is the efforts made by Hong Kong in developing a system of technical education and industrial training that has helped to make some of these changes possible, a system that is designed to meet the specific needs of the economy and seeks to match output of trained personnel with the economy's requirements. People were, and are still, Hong Kong's only natural resources. For this very reason, the quality of our people has a direct bearing on Hong Kong's competitiveness in the world. If Hong Kong is to improve its competitiveness, a sustainable adequate supply of well-educated and trained manpower, particularly at the technologist level, is essential. Given the fact that human capital is the single most important factor supporting Hong Kong's development, the Hong Kong Government has been and will continue to be firmly committed to investing heavily in education and training. The important development of the manpower training services in Hong Kong has included the set up of the Vocational Training Council (VTC) in 1982 which is responsible for, amongst many other things, instituting, developing and operating schemes for training operatives, craftsmen, technicians and technologists.

In the context of training at technologist level in Hong Kong, the main role of the universities is to provide education to first degree level and beyond. Post-graduate practical training is necessary for engineering graduates to integrate 'theory' with 'practice' so that they can develop and take up competently the responsibilities and role as a professional engineer in industry. However, employers are often reluctant to provide comprehensive practical training for engineering graduates knowing that the cost of initial training of engineers is high and there is no certainty that the engineer will remain with the employer after the training. In recognition of the increasing difficulty of Hong Kong engineering graduates in getting practical training in industry and of the need for assisting employers, particularly in the manufacturing sector, to make good the high initial cost of training engineers, the VTC launched the Engineering Graduate Training Scheme (EGTS) in 1983.

The Engineering Graduate Training Scheme (EGTS)

The objective of the EGTS is to assist engineering graduates to find positions with firms which could provide them with the range of training activities and experience necessary to achieve professional status. The EGTS achieves its goal in bringing about more practical training opportunities for engineering graduates by providing a financial incentive to employers to start and if possible to train more engineering graduates. The Hong Kong Government provides the funding for the EGTS through annual grants allocated to the VTC.

The EGTS is operated by the Committee on Technologist Training (CTT) of the VTC in conjunction with the Hong Kong Institution of Engineers (HKIE) with the former responsible for the administration of the Scheme and the latter standards setting and assessment. The HKIE was incorporated by a Government Ordinance in 1975. Since then, corporate membership of HKIE has been the primary qualification for employment as a qualified professional engineer in Hong Kong. The HKIE has a Graduate Training Scheme 'A' for training professional engineers. It is a comprehensive and well-structured training system aiming at fostering the development of engineering graduates in those technical and professional matters perceived to be required by a professional engineer. The normal training period of Scheme 'A'; is 3 years for Civil, Structural, Geotechnical and Environmental Engineering disciplines while 2 years for all the other engineering disciplines. The Scheme 'A' also provides the fastest route for engineering graduates to attain Corporate Membership of the HKIE. The HKIE has set out Model Training Guides for all the 16 engineering disciplines to assist companies in setting up training programmes for registration under its Scheme 'A' training.

To assist it in administering the EGTS, the CTT set up the Sub-Committee on EGTS. The membership of the CTT and the Sub-Committee on EGTS includes representatives from employers, employers' associations, tertiary institutions, industry-support organisations, HKIE and relevant Government departments; with the majority of members from industry.

Eligibility for the EGTS

Any employer in Hong Kong wishing to provide his graduate trainees with practical training of a standard acceptable for corporate membership of the HKIE is eligible for EGTS training subsidy. To meet the high cost of initial training, each graduate trainee undertaking the EGTS training is granted a subsidy from the Government for a period up to a maximum of 18 months. The subsidy is paid through the trainee's employer as part of his salary and is subject to annual review by the CTT against the salary trend. The present rate of subsidy is HK$5,885 per month per graduate trainee. There are about 300 training places provided annually under the EGTS.

Under the EGTS, practical training is provided by employers of the graduate trainees. Training programmes of participating firms must first be approved by the HKIE before they could be registered with the VTC for EGTS training. Employers' applications will be approved by the Sub-Committee on EGTS. The Technologist Training Unit of the VTC is the executive arm of the CTT. Apart from the day-to-day administration of the EGTS, the Unit operates a free service to assist employers in dealing with the training of engineering trainees and the EGTS. The Industrial Training Officers of the Unit may, upon request, assist employers in drawing up detailed training programmes and training supervision arrangements for submission to the HKIE for approval. The Unit also operates a free graduate placement service to help participating firms to recruit graduates trainees for EGTS training.

Engineering graduates of local or overseas universities who are Hong Kong permanent residents and possessing an engineering qualification acceptable for the Corporate Membership of the HKIE are eligible to join the EGTS.

Recruitment of Trainees for EGTS Training

At the beginning of each year, EGTS participating firms are invited to indicate the number of engineering graduates they wish to recruit within the forthcoming financial year. The Sub-Committee on EGTS has devised criteria for the equitable allocation of subsidized training places to EGTS participating firms. Employers will be advised of the number of allocated training places in May so that they could proceed the recruitment of engineering graduates for EGTS training. Employers having difficulties in recruiting fresh graduates may approach the VTC's Technologist Training Unit for help in recruitment. The following conditions have also to be met before an application for EGTS subsidy submitted by an employer could be approved:

i) The allocated training places should normally be filled by fresh graduates (i.e. graduating within the financial year)

ii) In disciplines other than Civil, Structural, Environmental & Geotechnical Engineering, trainees should normally have completed an approved basic training course.

iii) Recruitment should be completed within 6 months of receipt of the approval of recruitment.

Employers may recruit overseas graduates without approved basic training provided that they agree to release these graduate trainees for basic training in VTC training centres. Provision of basic training to these graduate trainees by the VTC is free on the condition that employers are required to pay the normal salaries to these trainees for the whole basic training period.

Monitoring of EGTS Trainees' Training Progress

The training of each trainee under the EGTS is closely monitored by the CTT through the trainee's Engineering Supervisor. Engineering Supervisors must be Corporate Members of the HKIE in the same discipline as the trainee's and hold a responsible position in the organisation providing the training. As Engineering Supervisor is the defecto representative of the HKIE in the organisation, the appointment has to be approval by the HKIE. In organisations where suitable Engineering Supervisors are not available, the CTT will assist such employers in finding External Engineering Supervisors whose service is voluntary.

An Engineering Supervisor is required to

i) ensure that the trainee receives training in accordance with the approved training programme,

ii) be available to the trainee to discuss training, technical and professional matters.

iii) verify and endorse the trainee's HKIE training log book for submission to the CTT; and

iv) conduct formal meetings with the trainee to assess his progress.

Throughout the entire training period, trainees are required to maintain HKIE training log books. For the purpose of subsidy payment, employers are required to submit to the CTT copies of their trainees' HKIE log books on a quarterly basis for inspection by the Industrial Training Officers (ITOs) of the VTC.

Apart from the firm's internal arrangement for monitoring the training progress of EGTS trainees, the ITOs of the VTC will also interview EGTS trainees during their subsidized period to check their progress and HKIE training log books.

On satisfactory completion of the EGTS training, employers are required to submit to the CTT a final training report of each trainee covering the entire EGTS training for the issue of Certificate of Completion of Post-graduate Training to the trainee.

When the EGTS was first introduced in 1983, it accepted only those training programmes approved by the HKIE under Scheme 'A' training. In order to provide more training places under the EGTS, with effect from 1.1.1985, it had been expanded to cover also training programmes approved by some of the professional engineering institutions in the UK. The CTT accepted these institutions as they did approve overseas training programmes and their corporate membership was fully recognised by the Hong Kong Government. However, in view of the substantial increase in the number of firms having HKIE approved training programmes, the CTT decided that commencing 1995, priority be accorded to training prgrammes administered by the HKIE when allocating training places to EGTS participating firms.

Following the decision of the HKIE to accept firms' training programmes with training wholly or partly conducted in Mainland China under Scheme 'A', the scope of the EGTS was expanded in August 1992 to accept these training programmes.

The CTT has regularly reviewed the scope of the EGTS to include new engineering disciplines to meet the industry needs. At present, all the 16 engineering disciplines under HKIE Scheme 'A' have been included in the EGTS.

As at 31.5.2000, a total number of 385 training programmes from about 230 companies have been approved under the EGTS. Some 3945 graduate and 310 sandwich trainees have been subsidised since the launch of the EGTS in 1983. Among them, 3084 graduate trainees have completed their EGTS training. At present, there are 384 graduate and 5 sandwich trainees still undertaking the EGTS training. The distribution of these past EGTS graduate trainees by their engineering disciplines is shown in Appendix 1. Appendix 2 shows the distribution of the EGTS graduate training places by engineering disciplines allocated to participating firms for the past five years. Appendix 3 shows the trend of the EGTS subsidy as percentage of the graduate trainees' weighted average monthly salary as proposed by their employers for the last 5 years.

New Technology Training Scheme (NTTS)

The restructuring of Hong Kong's economy over the past decade witnesses its development into a knowledge-driven and technology intensive economy. In this fast-changing, knowledge-based economy where new skill requirements emerge rapidly, it is important for those already in work to improve their knowledge and skills. For this reason, the Hong Kong Government has been taking an active role in helping employers in acquiring new technologies as well as in promoting a culture of life-long learning among the workforce in collaboration with tertiary education institutions, industry-support organizations and industry. This life-long learning is particularly important for our engineers who are expected to be able to master technological advances and to put them to good profitable use by their employers. It is against this background, the VTC launched the New Technology Training Scheme (NTTS) in June 1992.

The NTTS is administered by the Committee on Technologist Training (CTT) of the VTC. To assist it in administering the NTTS, the CTT set up the Sub-Committee on Training in New Technologies. The purpose of the NTTS is to provide financial assistance to employers wishing to have their staff trained in new technologies which would be beneficial to Hong Kong. In the context of the NTTS, new technologies include those which are either new or not widely applied in

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Hong Kong and the absorption and application of which would significantly benefit Hong Kong. The NTTS is financed by the income earned from the investment of the New Technology Training Fund set up under trust on behalf of the Hong Kong Government.

In view of the rather lukewarm response from employers in the first few years, the Government, on the recommendation of the VTC, approved the implementation of the following improvement measures to enhance the attractiveness of the NTTS in February 1997:

i) to raise the level of grant from 50% to 75% of the total cost of training incurred by an applicant;

ii) to remove the grant ceilings of $37,500 per trainee for overseas training and $15,000 per trainee for local training; and

iii) to extend assistance to other forms of training including tailor-made local training courses for individual companies if they meet the NTTS's objectives; and

iv) to further promote the NTTS and make it clear that the NTTS covers not only the manufacturing industries but also the service industries.

Types and Amount of Training Grant

Under the NTTS, there are three kinds of training grant:

Type A - Overseas training courses or work attachments.

The training cost may cover:

i) A return air passage to the overseas facility by the most economical and convenient means;

ii) A reasonable subsistence allowance for the duration of training at the overseas facility;

iii) Training expenses including course fee and course materials etc.;

iv) Any other fees charged by agencies responsible for identifying the placement concerned.

The training grant can be up to 75% of the total training cost.

Type B - Local training courses or work attachments. The training grant can be up to 75% of the training cost which will only cover the course fee.

Type C - Tailor-made training courses for individual company.

Employer may apply for grants to bring in overseas trainers to conduct training courses locally or engage training organisations or higher education institutions to organise tailor-made training courses to suit their needs. If overseas trainers are brought into Hong Kong, the grant will also cover a return air passage, a reasonable subsistence allowance and the professional fee charged by the overseas trainers if they are not brought in from the applying company's parent or subsidiary company.

Eligibility for the Scheme

A company in Hong Kong wishing to have its staff trained in a new technology for commercial application may apply for a training grant. The company must be a non-government or a non-government subvented organisation. Furthermore, the trainee must

(i) be a permanent resident of Hong Kong,

(ii) have the necessary education/experience to benefit from the training, and

(iii) be company-sponsored.

Approval of Applications

Each application will be considered based mainly on whether the absorption and application of the new technology concerned will benefit Hong Kong. To this end, the Sub-Committee on Training in New Technologies has laid down stringent criteria for assessing the suitability of training courses to ensure that the application of the new technologies concerned will benefit employers in improving efficiency, productivity and quality. The general approval criteria are:

(i) the technology should be new or has not been widely used and would benefit the local economic sector;

(ii) the employer and the trainee can benefit from the proposed training;

(iii) the quality of the training programme;

(iv) the course content should include application of the technology concerned, case studies and other practical elements to effect technology transfer.

For tailor-made training courses for individual company, an applying company is further required to provide the following information:

(i) the reasons why the proposed training could not be obtained through attending existing courses provided by local course providers;

(ii) the objective and the relevance of the proposed training to the company's needs;

(iii) the company's plan of using the knowledge and skills acquired by the trainees;

(iv) the company's plan for diffusion of the proposed technology by the trainees to other workers of the company; and

(v) the detailed implementation schedule of the acquired technology by the company.

These criteria are regularly reviewed by the Sub-Committee to ensure that they are adequate and appropriate in meeting the objective of the NTTS.

The Sub-Committee has maintained an Indicative List of New Technologies which serves as an internal reference for vetting and approving applications submitted under the NTTS. In most cases, the Sub-Committee also seeks outside expert advice from local tertiary institutions and the interested parties on the relevancy and appropriateness of the applications submitted. The Indicative List is regularly updated through VTC's training boards and general committees and the Industry and Technology Development Council to take into account the latest technological developments. Furthermore, to help Hong Kong's small-and-medium enterprises (SMEs) make better use of the NTTS, these training boards/committees are requested in the course of updating the List to give thought to those current technologies which are not yet widely applied in SMEs. The List will also be sent to the Small and Medium Enterprises Committee of the Industry Department for comments so that technologies which have not yet been widely applied amongst SMEs will be included.

Since its inception in June 1992 and up to 15 June 2000, there have been a total of 8,773 applications approved under the NTTS involving training grants of a value of some HK41 million. A breakdown of the approved applications for NTTS training grant by types of training is as follows:

Type of Training Courses		Total No. of Trainees Approved for Training
Local		7228 (82.4%)
Overseas		471 (5.4%
Tailor-made		1074 (12.2%)
	Total	**8773 (100%)**

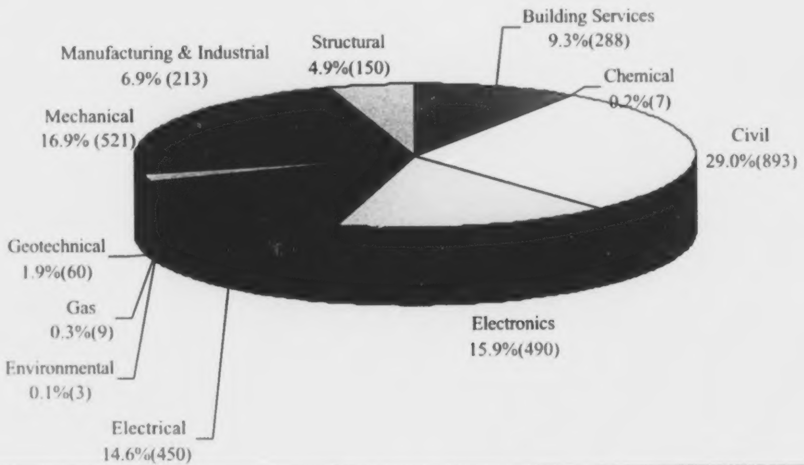
CONCLUSION

Technology and innovation will be the driving forces for sustained economic growth as well as the basis for Hong Kong to compete successfully in the global marketplace. The Hong Kong Government is determined to turn Hong Kong into a knowledge-based economy and dedicated to enhancing the innovation and technology capacity of the private sector. Given the fact that human capital is the single most important factor supporting Hong Kong's development, the Hong Kong Government will endeavor to ensure the availability of a continuing and adequate supply of well-educated and well-trained manpower , particularly at the technologist level , that has the ability to cope with the changing needs of the technological advances. In this connection , the EGTS and the NTTS have been playing a vital role in assisting the Hong Kong Government to accomplish its commitment to making Hong Kong a centre of innovation and technology . This is because through the funding support under the EGTS, employers are willing to provide their graduate trainees with an all-round training hereby ensuing the availability of a pool of well-trained professional engineers in Hong Kong. Likewise, the NTTS has achieved its objective as not only training courses approved under the Scheme will benefit the local industry by bringing in new technologies , but also the Scheme has provided employers, particularly the SMEs, the impetus needed to send their staff for training in new technologies.

APPENDIX I

Building Services	288
Chemical	7
Civil	893
Electronics	490
Electrical	450
Environmental	3
Gas	9
Geotechnical	60
Mechanical	521
Manufacturing & Industria	213
Structural	150
Total	3084

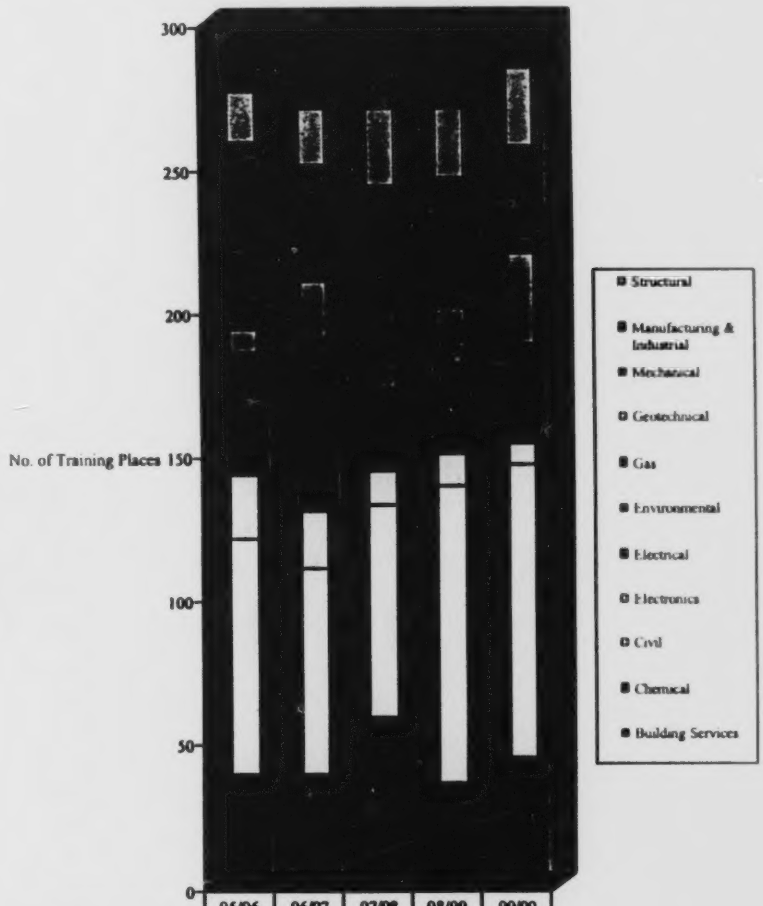
A Pie Chart Showing the Distribution of the Graduate Trainees by their Engineering Disciplines Having Completed EGTS Training Since 1983



APPENDIX II

Year	*95/96*	*96/97*	*97/98*	*98/99*	*99/00*
Building Services	37	37	56	34	44
Chemical	1	1	2	1	0
Civil	82	72	74	104	102
Electronics	22	20	12	11	7
Electrical	43	20	27	33	29
Environmental	0	20	0	2	4
Gas	0	20	1	1	2
Geotechnical	8	20	9	14	31
Mechanical	45	20	47	35	28
Manufacturing & Industrial	20	20	15	11	10
Structural	18	20	27	24	27
Total	276	20	270	270	284

The Distribution of the EGTS Graduate Training Places by the Engineering Disciplines for the Past 5 Years



	95/96	96/97	97/98	98/99	99/00
☐ Structural	18	20	27	24	27
■ Manufacturing & Industrial	20	20	15	11	10
■ Mechanical	45	20	47	35	28
☐ Geotechnical	8	20	9	14	31
■ Gas	0	20	1	1	2
■ Environmental	0	20	0	2	4
■ Electrical	43	20	27	33	29
☐ Electronics	22	20	12	11	7
☐ Civil	82	72	74	104	102
■ Chemical	1	1	2	1	0
■ Building Services	37	37	56	34	44

Year

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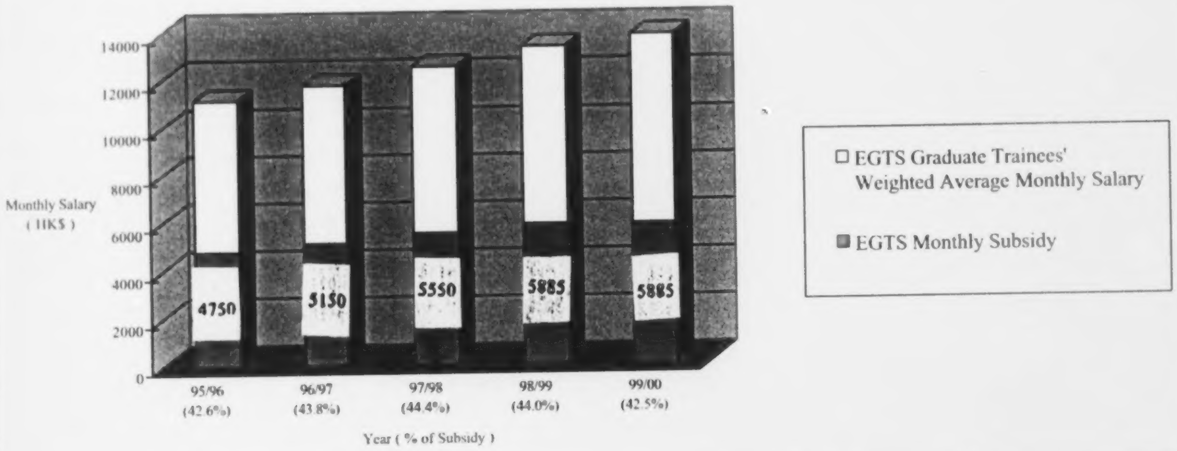
APPENDIX III

Year	EGTS Monthly Subsidy	EGTS Graduate Trainees' Weighted Average Monthly Salary	Total Salary	%
95/96 (42.6%)	4750	6401	11151	42.6
96/97 (43.8%)	5150	6621	11771	43.8
97/98 (44.4%)	5550	6949	12499	44.4
98/99 (44.0%)	5885	7489	13374	44.0
99/00 (42.5%)	5885	7952	13837	42.5


The Trend of the EGTS Subsidy as Percentage of the EGTS Trainees' Weighted Average Monthly Salary Proposed by their Employers

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VOCATIONAL EDUCATION AND TRAINING FOR OPERATORS OF MODERN ENTERPRISES

Qinxiang Gao Meichi Huang Heping Yu
(Beijing Electric Power College)
North Jiao Tong University, Beijing

Index: Vocational Education, Curriculum Development, On Job Training

Abstract: The idea of how to run an effective and efficient vocational education and training system (**EEVETS**) with enterprises is given in this paper. It includes curriculum, teaching method, teaching support, quality control and management, etc. The keys to form **EEVETS** are demand analysis, motivation mechanism, teachers and tutors, quality control and service support. The training system for modern power station operators is briefly given as an example.

INTRODUCTION

As the great and continuous progress of science and technology, the level of equipment of modern enterprises becomes higher and higher. The renewal period of equipment is going shorter and shorter. The damage of accident becomes much serious in huge operating system in modern enterprises. The requirement for operators' ability is much higher nowadays. By analyzing the details of accidents and the situation of the staff (especially the operators) of North China Power Group (**NCPG**), an **EEVETS** for operators is designed and performed. The **EEVETS** has been running three years. More then 200 operators of **NCPG** have been trained for running large power generation system (300MW or larger power generation system). Also, the **EEVETS** is used for other staff as the requirements of enterprises. More then 5000 persons have been trained per year in our college.

DEMAND ANALYSIS FOR EEVETS

The first important thing to construct an **EEVETS** is demand analysis. Several serious accidents happened in 1997 in **NCPG**. As the result of accident investigation, the quality of operators is a concerned focus. The committee of production security of **NCPG** determined that all operators must be well trained for operating the modern power generation system. Beijing Electric Power College (**BEPC**) was appointed for the task. **BEPC**, operation department of **NCPG** and human resource department of **NCPG** organized an investigating project which consists of two aspects: analysis and professional test of staff members. The results are as following:

The academic level of staff is showed as Fig.1. This is one result of analysis of staff members of **NCPG** Company. Here it shows the average academic level is low. There is a great urgent need to add their knowledge both in basic and special courses.

The result of professional test is showed as Fig.2. It indicates their technique and skills are to be improved and operating knowledge as well.

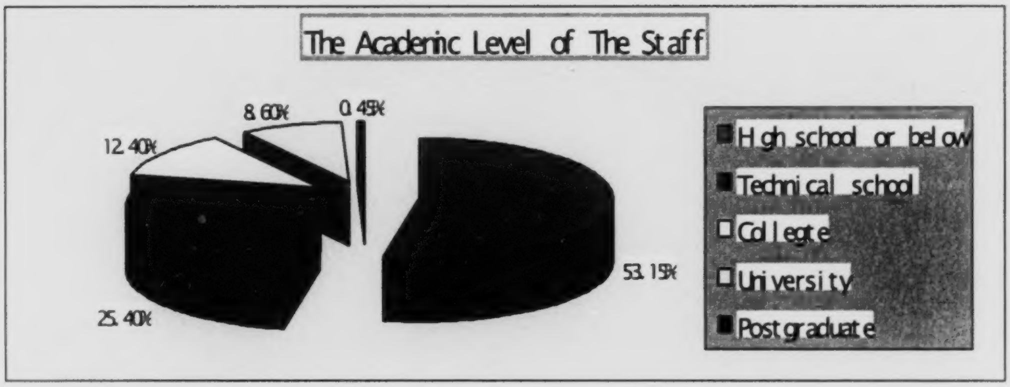

Fig.1 Investigation Result of The Academic Level

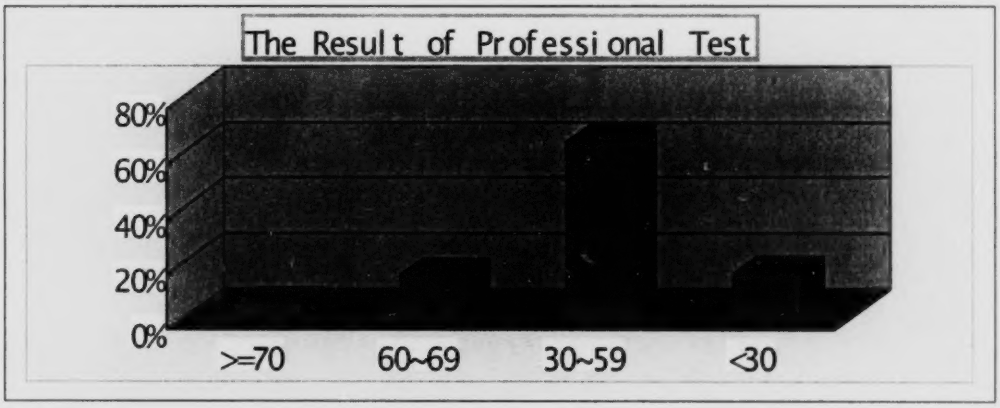

Fig.2 Result of Professional Test (Without Preparation)

Through demand analysis, three aspects of key knowledge are drawn out. They are systematical frame knowledge of running system, special knowledge of normal operation and special knowledge of breaking down accidents. And, the way to strengthen operators' ability of knowledge application is also designed in training system. Training on simulator is an effective way to improve operators' ability highly.

MOTIVATION MECHANISM IN EEFVETS

The second important thing to construct an **EEVETS** is to construct a motivation mechanism for operators' knowledge renewal. A human resource development strategy is settled in enterprise firstly. The purpose of it is to motivate the staff members, managers, in-plant educational departments and vocational education organizations. Following the strategy, an on-job training system is settled with operation system. Each operator is regularly evaluated according to the criterion set by national organization, enterprises association or enterprises itself. Operators can take on operation with a professional license. Those who have not passed will be laid off and they have to get trained until they

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pass the training and evaluation. The professional license should be renewed in a certain period of time.

The scholarship is awarded according to the performance. This is also a part of motivation mechanism for operators' knowledge renewal. The vocational education and training organization spread the scholarship to the trainees according to two items: one is scores and the other is a behavior in obeying regulations and partnership with others. The fund of the scholarship is provided by enterprises.

TEACHERS AND TUTORS IN EEVETS

The third important thing to construct an **EEVETS** is a network of high-level teachers and tutors. As we know the feature of power system is technology-centered and integrated, in which large capacity and high parameters generating units are adopted. So it brings about deeper and higher demand for education and training than conventional colleges education and in-plant training. From this point of view we combined the professors in colleges, senior engineers and experienced operators in enterprises into a group that is organized as a dynamic net. Its members are much experienced in education, training and practice and come from all units in north China from decision-making level, management level to operational level.

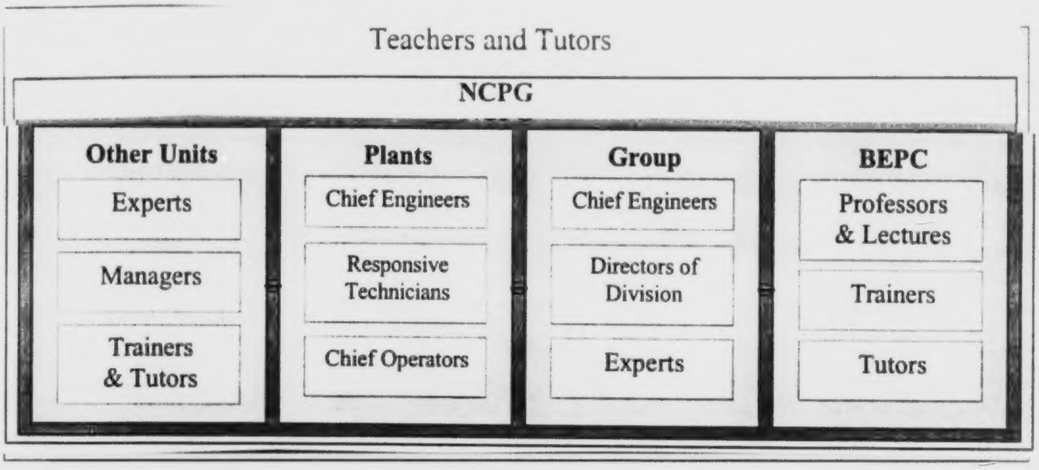
Teachers and Tutors
NCPG
Other Units
Experts
Managers
Trainers & Tutors
Plants
Chief Engineers
Responsive Technicians
Chief Operators
Group
Chief Engineers
Directors of Division
Experts
BEPC
Professors & Lectures
Trainers
Tutors

Fig.3 The Network of Teachers and Tutors

The program and syllabus is made by them and suitable curriculum is developed according to the demand analysis. Preparation of the teaching materials is very complicated and needs a great deal of knowledge and experience. The teaching materials are prepared by them.

Simulator-related training is an important part of the training, which accounts for nearly a half of program. The trainers have been trained and got the licenses to take the job.

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QUALITY CONTROL IN EEVETS

The fourth important thing to construct an **EEVETS** is quality control. It includes a strict examination system, a thesis tutor system and a committee of evaluation.

Three phases are set during the program. The first one concerns about technical basis; the schedule focuses on basic courses on electrical, thermal and automation technology. The exams are about knowledge. The second one focuses on the operating system which consists of frame knowledge of operating system, special knowledge and application. The exams are about application and analysis of the knowledge. The third one is on the simulator in which the start-up and shutdown of the generating units are presented here and dealing with abnormal situation and accidents are also practiced. The exams are about operating skills and ability to tackle the abnormal situation and accidents. They are operational and practical ones. All exams are supervised by the committee of evaluation.

All trainees are expected to submit papers of which the themes are set based on the actual situation of the trainees' plants, recognized by the experts of that plant and finalized by the committee of evaluation. The guidance is undertaken by both the experts from plants and professors from colleges. The paper defense is conducted by the committee of evaluation.

The main duties of the committee of evaluation are to evaluate instruction of teachers and tutors and learning and practice of trainees as well.

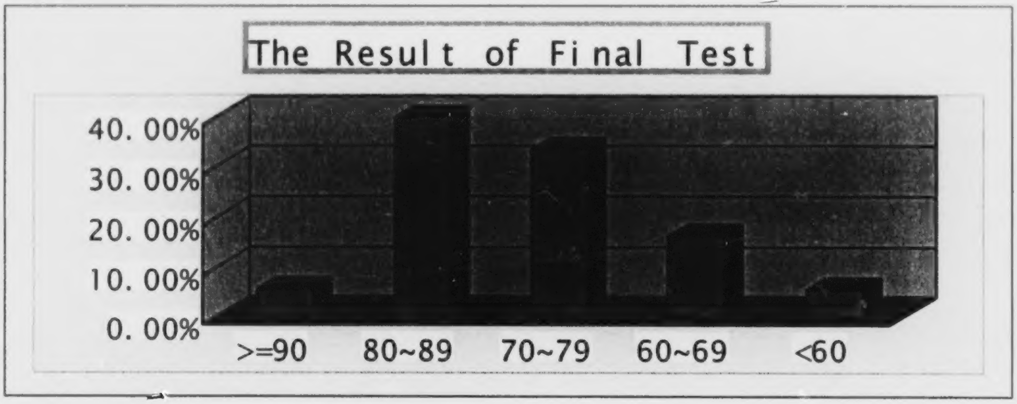

Fig.4 The Result of Final Test (At the End of Program)

The selection of the committee members is done strictly and carefully through the whole area of north China from among well-known scholars and experts. A third come from colleges and another third from power plants, the rest one from other units. The total number usually reaches about 20.

SERVICE SUPPORT FOR EEFVETS

Finally, the service support to **EEVETS** is also very important and valuable. The mode of project management is applied to vocational education and training.

A administrative group with the connection and coordination with the enterprises as their duty is set to conduct the program. This group is also the organizer and coordinator in the college. In this group two divisions are responsible for instruction and services. The teams in the instruction division are responsible for feed-backs of students and evaluation of the teachers and routines etc. The teams in the services provide the accommodation, entertainment, health care and other needs and requirements. Their services are covering both the students and teachers. The existing human resources and equipment in colleges and enterprises are utilized thoroughly for providing the services.

CONCLUSION

With the rapid development of electric industry the linkage between colleges and enterprises becomes more and more tight. Vocational education and training plays a role of reservoir (talents bank) and gas station (life-long learning). The systematic method is applied to put all employees in the parallel orbit so as to optimize production elements, raise productivity and improve the operation of the enterprises wholly.

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THE CONDITION AND COMPETENCY OF MULTI-ENTRANCES FOR PERSONNEL TRAINING OF INDUSTRIAL DESIGN ENGINEER IN TAIWAN

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Index: Industrial Design Education, Multi-Entrances, Learning Effectiveness

Abstract: The policy of college multi-entrances would enable students to select favorite departments and majors according to their interest and abilities, and also to increase the opportunities of being selected. This study tries to find the relationship between the channel of multi-entrances and learning effectiveness, then it sorts out the proper entrance channel and the requirements in personality and competency for students in industrial design department. Furthermore, instructors can refer the study results to improve students' learning effectiveness and further promote the personnel training of industrial design engineer in industrial design education to achieve a successful education quality and performance.

INTRODUCTION

The joint college entrance exam is the only channel for entering colleges in the past in Taiwan. Due to the lack of interest testing, students would not be properly instructed with regard to major field of study according to their interest and therefore causes the waste of educational resources for those departments requiring special disposition and basic technique. In 1998, the Ministry of Education announced that the ways of entering college for college bound students would change to "multi-entrances" instead of depending on only one-time examination in order to popularize compulsory education and to promote people's educational capacity. At present, the channels of entering colleges become more and more flexible. However, people question whether or not students coming from different channels have similar performance in learning effectiveness. In other words, is there any positive relationship between learning performance and entering channels? Furthermore, what are the main required factors influencing students' learning effectiveness? The above-mentioned questions should be highly concerned and addressed with the best solution possible.

The Ministry of Education adopted "multi-entrances" including application, recommended exam and joint-exam. All colleges can decide their own requirements of selecting students, especially majors in creative design and art. For example, extra design practice exam, portfolio review and oral interview can be used for further advanced choice to achieve the goal of selecting right person for the right field.

Therefore, the purpose of this study is to investigate the extent to which characteristics of personality and competency would be required for students in industrial design in order to have better learning performance. Furthermore, the study focuses on analyzing the relationship between these required characteristics and different channels of entrance.

LITERATURE REVIEW

Based on the opinions of scholar and expert, "creativity", "expression capability", "aesthetics general capability" are the required competencies for the students majored in industrial design engineering. Furthermore, "form capability", "analysis capability", "imaginative power", "planning ability", "observation ability", "sensibility" are also very important to those students as well.

After comparing the required competencies of industrial design students with types of personnel attributes, the study found that there are three types of attributes associated with requirements and competencies for industrial design students according to Holland's personnel attributes:

(1) Artistic - It is the most important requirement attributable for industrial design students. It includes the ability of art, creation, innovation, and sense. Students can express beauty, thought and feeling through text, action, voice and color.

(2) Investigative – It is also an important requirement next to artistic. This type of students can utilize their intelligence and analytical ability to observe, evaluate, judge and solve problems.

(3) Enterprising – This type is as important as investigative. People of enterprising can utilize their abilities of planning and leadership to arrange affairs and manage peoples for promoting the benefits of organization, politics, economy and society.

RESEARCH METHODOLOGY

The study selects students from industrial design department as samples in survey. The study first adopts literature review method to sort out the essential characteristics such as the ability of creation, innovation and analysis for industrial design students, and then utilizes those requirements to compare with Holland's personnel attributes in order to summarize the required characteristics for industrial design students. The relationship between students' characteristics and learning effectiveness in industrial design field from different ways of entrance is further analyzed. In addition, the factors affecting students' learning effectiveness are also investigated as well. Finally, the study proceeds statistical analysis based on grade evaluation from related industrial design courses to understand the relationship between the learning effectiveness and multi-entrances.

The research tools include three parts in the study:

(1) Questionnaire of personnel attributes based on Holland's six attributes from the literature.

(2) Questionnaire survey of effective learning from students.- according to student's opinions, the result of study would show the effective learning in different courses. The survey adopts Likert scale measurement, from 1 to 5 for "very bad" to "very good".

(3) Grades of related design courses.- course grades include fundamental design, color study, sketching, engineering drawing.

RESULT AND DISCUSSION

Related numbers are shown as box plots and relevant analysis with SPSS software is used to perform the analysis. The upper and lower lines in the box plots chart stand for the largest and the smallest numbers. The middle bold line stands for the media; the shadow stands for the deviation; the middle of shadow stands for the mean; entrance method 1 stands for joint entrance exam, method 2 stands for recommended interview, and method 3 stands for application of entrance. The analysis is as following:

(1) Comparison of student's interest and characteristic from different types of entrances

The comparison of student's personnel attributes on artistic, investigative, and enterprising types from different types of entrances are shown in figures 1. The study obviously appears that the mean and media of three types of personalities for students from "recommended-exam" and " application entrance". In addition, the scatter of personality for "Joint-exam" students is wider than the others.

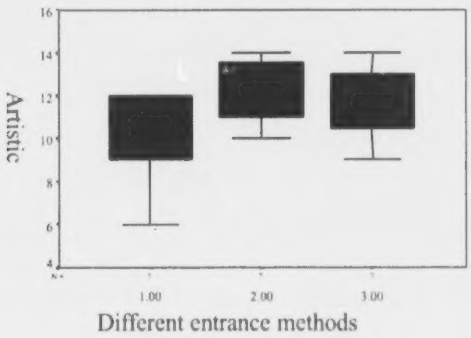

Figure1. Students' personnel attributes on artistic type from different entrance methods (1stand for Joint entrance exam, 2 stand for recommended exam, 3 stand for application entrance)

(2) Comparison of student's learning performance from different types of entrances

Figures 2 illustrate the comparison of student's learning performance on fundamental design, sketching, engineering drawing and color study classes from different types of entrances. It appears that students from "application entrance" have the best performance in the classes of fundamental design, sketching and engineering drawing within three different groups. Furthermore, " recommended-exam" students rank the second. Students from "Joint entrance exam" don't have a good performance in the classes, especially in the sketching and fundamental design. The result further indicates that learning and training of fundamental art and design in the past for those students from each of the three cohorts would be considered to be basic components necessary to help with the link of associated classes in college.

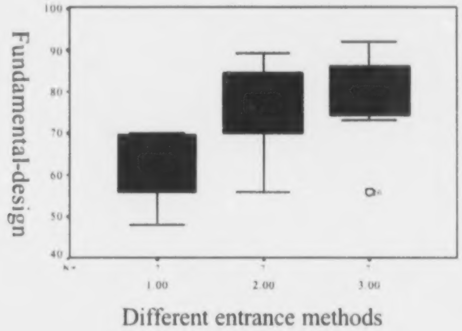

Figure2. Grades of fundamental-design course from different entrance methods

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(3) Teaching evaluation from students of different types of entrance

Students from the channel of "application-entrance" have higher learning evaluation for study of fundamental design, sketching and color courses than the other groups. (see figures 3). In figure 11, the result shows that the different groups from the three types of entrances have a similar teaching evaluation for study of drawing. As a result, students from the channels of "application" and "recommended exam" entrances have the better performance and acceptance of classes than students from the entrance of "joint exam". The study found that students from "application" and "recommended exam" entrances have good evaluation for the study of fundamental design, sketching and color study because basically they are equipped with better fundamentals of drawing and art.

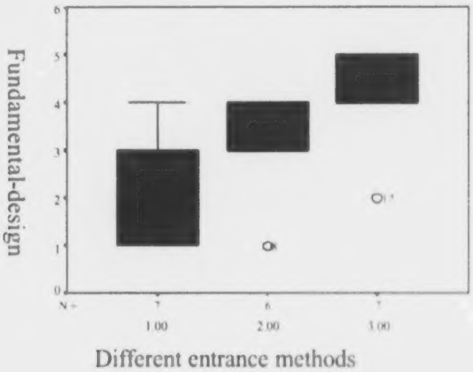

Figure3. Teaching evaluation for fundamental-design course from different entrance methods

(4) The relationship between learning performance and personnel attributes

Table 1 illustrates a significant relationship between the performance in sketching class and personality of artistic type. In addition, the result shows that there is a positive relationship between the performance of sketching and fundamental design. The strong relationship between sketching and artistic characteristics is also shown in Figure 4. However, the study shows there is no relationship between fundamental design and artistic characteristic. Furthermore, it found that fundamental design class requires not only aesthetics but also the creation of physical concept so students with artistic personality can not totally raise their performance.

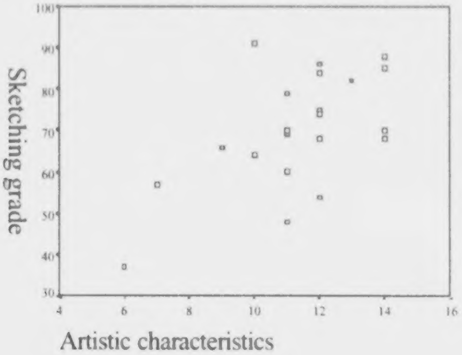

Figure4. The relationship between sketching grade and artistic characteristics

(5) The relationship between evaluation of design course and characteristics of personality

Table 2 reveals a significant relationship between the characteristics of artistic personality and learning evaluation for the study of fundamental design, sketching, and color courses. The result indicates that students with characteristics of artistic personality have a better acceptance of learning in the classes of artistic creation such as fundamental design, sketching and color courses.

Table 1. The relationship between the course performance and the personality of artistic type

	Artistic	Sketching grade
Fundamental design Pearson Correl. Coef.	0.320	0.659**
Significant(Two tail)	0.157	0.001
Sketching Pearson Correl. Coef.	0.585**	
Significant(Two tail)	0.005	
Color courses Pearson Correl. Coef.	-0.279	-0.131
Significant(Two tail)	0.220	0.570
Drawing Pearson Corre Coef.	-0.279	0.278
Significant(Two tail)	0.234	0.235

** Statistically significant, $p=0.01$,(Two tail)

* Statistically significant, $p=0.05$,(Two tail)

Table 2. The relationship between evaluation of Design Course and Artistic Personality

Design Course	Artistic Personality
Fundamental design Pearson Correl. Coef.	0.726**
Significant(Two tail)	0.000
Sketching Pearson Correl.Coef.	0.473*
Significant(Two tail)	0.031
Color courses Pearson Correl. Coef.	0.525*
Significant(Two tail)	0.014
Drawing Pearson Correl. Coef.	0.127
Significant(Two tail)	0.584

** Statistically significant, $p<0.01$,(Two tail)

* Statistically significant, $p=0.05$,(Two tail)

CONCLUSION AND SUGGESTION

(1) The study reveals that there is a positive relationship between performance of sketching class and characteristics of artistic personality for industrial design students. But, the study also shows that it is necessary for further research on the performance of fundamental design and color study

classes and the characteristics of artistic personality because the study showed that there is no relationship between them.

(2) The study concludes that students with "application entrance" have the highest performance in design related classes except for color study class; the students with "recommended exam – entrance" is next , and the students with "Joint exam – entrance" is the last. In the aspect of personality characteristics, the average and medium score for students in artistic, investigative and enterprising for "joint-exam-entrance" is lower than students with entrances of recommended – exam and application. In addition, students with "joint exam " entrance are more spreading out in personality characteristics. Furthermore, in the aspect of class evaluation, students from the "application – entrance" have the highest evaluation in the artistic classes than the other groups. For the "engineering drawing class", there is a similar evaluation in the three different groups of students. In conclusion, the study shows that students from the entrance channels of "recommended – exam" and "application" have a proper foundation of art and have more interest in major of design and art before entering school. And, they have better performance, artistic characteristic and acceptance of the classes than students coming from the "joint – exam " entrance.

(3) As a result of statistical analysis, students from the "joint-exam" entrance have wide dispersion in studying courses, and it shows that some of students may be suitable for major in industrial design but some others don't. Therefore, teachers should pay more attention to students' personality and characteristics and give more instruction to high quality students so that they would have better opportunity to enhance their further learning.

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ESTABLISHMENT OF THE ADVANCED PRINTING TECHNOLOGY CENTRE AT HONG KONG INSTITUTE OF VOCATIONAL EDUCATION (KWUN TONG)

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Abstract: This paper describes an industry and academic partnership initiative at Hong Kong Institute of Vocational Education (Kwun Tong). The project includes the establishment of the Advanced Printing Technology Centre at the Institute using a US$1.1 million funding from the Government. The Centre has set up a state-of-the-art digital printing production environment with equipment connected together using high-speed computer network. Generous support has been obtained from equipment manufacturers, which have installed about US$2.3 million worth of advanced equipment at the Centre. This initiative has created a 3-way winning situation for the students, the industry, and the equipment manufacturers. The students can acquire hands-on experience in using the advanced printing equipment, the printing industry can send its personnel to the Centre to receive training, and finally the manufacturers can use the Centre to showcase their latest products. This kind of establishment creates a partnership model that benefits all parties concerned and the model can be extended to other industries as well.

INTRODUCTION

Innovation and technology support initiatives have been implemented in many countries around the world. These government programmes typically provide financial assistance to tertiary institutions, trade associations, and non-profit organisations to develop innovative products and services with the objective that these innovations will contribute to the economic prosperity of the local economy. This paper describes the establishment of the Advanced Printing Technology Centre (APTEC) at Hong Kong Institute of Vocational Education (Kwun Tong) using a grant of US$1.1 million from the Innovation and Technology Fund. The Fund is an initiative administered by the Industry Department of the Government of the Hong Kong Special Administrative Region with the prime objective to support the development of new technology and its application in industry. The Centre has received generous support from major equipment suppliers - it is equipped with US$2.3 million worth of latest digital printing equipment, which are provided by the suppliers on a consignment basis. Using these equipment and the money from the Fund, the Centre has set up a multi-vendor digital printing production environment with equipment connected together using high-speed computer network.

PRINTING INDUSTRY IN HONG KONG

Hong Kong is one of the four largest printing and publishing centres of the world. In particular, Hong Kong's printing industry is well acclaimed for its quality, quick delivery, competitive pricing and ability to cope with short run printing jobs. To maintain this leading position, the industry is keen in upgrading itself through continued investment in advanced machinery and equipment. In fact, Hong Kong's printers installed the world's 2nd and 3rd ten-colour offset printing presses, which costed more than US$2.5 million each. Apart from the local printing establishments, the industry also attracted major foreign investment, which reached US$295 million in 1996.

Despite the willingness of the printing industry to invest heavily in capital equipment, Hong Kong is slower than other neighbouring Asian countries in moving to the new era of digital technology. For example, in 1999, the world wide installation of computer-to-plate (CTP) equipment, a major component of digital printing, was over 3,000, whereas in Hong Kong, there was less than 10 CTP equipment installed. One may find high-end computer graphics equipment running in local printing companies, but in most cases, the equipment are not linked up in a well-defined network of workflow. The major reasons for this phenomenon are:

1) The digital printing technology is still evolving very quickly and the equipment can become obsolete in a short period.
2) There are different industry standards, and connectivity of the equipment manufactured by different suppliers is still a problem.
3) There is a lack of knowledge and expertise among the business executives and technical professionals in the local printing industry to manage a "digital printing factory".

BACKGROUND ON THE ESTABLISHMENT OF APTEC

The Hong Kong Printers Association (HKPA), which was established in 1939, is the oldest and largest printing association in Hong Kong. For many years, the Association has been very actively in supporting vocational education and promoting technology development. Recently the Association recognises the threat of fierce competition from the neigbouring countries and also the benefit of adopting the digital technology to the printing business. They approached the Printing Department of the Hong Kong Institute of Vocational Education (Kwun Tong), IVE(KT), regarding a collaboration to establish a technology transfer centre in the areas of electronic publishing and digital printing at the Institute. The Institute is the only education institution in Hong Kong that offers post-secondary vocational education in the printing discipline. And in recent years, the academic programme has been revamped in order to satisfy the changing manpower needs of the printing industry. The Institute's management agreed to co-operate with the Association because it believes that it is important to support the printing industry to educate its workforce concerning this new technology. Moreover, by having the technology transfer center at the Institute, the academic staff can acquire the latest information on the development of digital printing and the students can have the opportunity to learn using the new equipment. A proposal was submitted to the Industry Department and in mid 1999, a grant of US$1.1 million was approved by the government to establish the Advanced Printing Technology Centre at IVE(KT).

OBJECTIVES OF THE CENTRE

In order to support the printing industry, the Centre must establish itself as a leader in the field and should operate in a pro-active manner. It has the following objectives:

1) To promote the application of the electronic publishing and digital printing workflow to the local printing and publishing industry.
2) To educate the personnel in the industry on the migration from traditional manual publishing, prepress and printing operations to the new computer integrated workflow.
3) To create a real-life production environment to facilitate the investment decision of the companies in adopting the new technologies.
4) To organise tailor-made training programmes for company executives to cope with the impact of the digital technology to their business.
5) To promote the transfer of technology and dissemination of information from overseas equipment manufacturers to the local printing industry.

CURRENT DEVELOPMENT

The Centre was established in late 1999 and has 5 professional staff. It is divided into 3 sections: digital photography, electronic publishing, and digital printing. The equipment suppliers have been very supportive and have provided many state-of-the-art digital printing equipment to the Centre. Agreements have been reached with the suppliers that they will replace the equipment with newer models in a 6 - 12 month interval in order to maintain the latest equipment at the Centre. Major supporting companies included:

	Company	Equipment/Software
1.	Xerox	DocuColor 40 System w/ Splash Server DocuTech DT135 B/W Publishing System DigiPath Software
2.	Agfa	Galileo 'S' Platesetter Plate Manager with 2 Bins & Cassette Agfa LithoStar LP150 On Line Processor Apogee Workflow System ADTX RAID System Agfa Sherpa2 Imposition Proofer
3.	Dainippon Screen	Cezanne FT-S5000 Digital Proofing System PlateRite 8000 w/ Off Line Processor & Compressor Trueflow Digital Workflow System
4.	China Yin King - Purup Eskofot	EskoScan 2024 - LW Scanner (incl. EskoDDS & Perfection NT Kit Register Punch Unit)
5.	Scitex	Leaf Cantare Digital Camera Iris 43" Wide Proofer Brisque Workflow System (incl. Improof 750I/F + PDF2GO + Extreme Option and Export PS S/W option) Eversmart Supreme Scanner (incl. Scanner Oil Mounting Station & Eversmart Dot Kit)
6.	Heidelberg	Tango iXL Scanner w/ Tango Mount XL LinoColor 6.0

The total value of the equipment at the Centre is about US$2.3 million.

MANAGEMENT STRUCTURE

A Steering Committee (SC) is formed to establish policies regarding the overall operations and development of the Centre. The SC includes representatives from HKPA, IVE(KT), the Industry Department, academics, and other relevant trade associations. Below the SC is the Management Committee (MC), which includes key executives of HKPA and IVE(KT). It is responsible for the day-to-day management of the Centre and to oversee the implementation of policies and strategies established by the SC. Finally, under the MC is the Administrative Committee (AC), which includes members of the MC and representatives from key supporting equipment manufacturers. The AC is mainly responsible for the formulation of overall administration policies concerning the operation of the Centre and to establish administration procedures to safeguard the interest (e.g., intellectual properties) of the equipment suppliers. By including the equipment suppliers in the AC, it help ensure that the suppliers are involved in the decision making process and smoothen the working relationship between the suppliers and the Centre. The Technical Services Manager is the chief executive of the Centre and he/she is in charge of implementing the policies and strategies of the Centre. Figure 1 shows the management structure of the APTEC.

PERFORMANCE INDICATORS

The success of the project is measured by several performance indicators, including the number of technical visits, technology transfer seminars, training courses and consultancy services provided to the industry. And above all, the most important performance metric is the number of companies that have successfully implemented the digital workflow because of the services they have utilised at the Centre.

BENEFITS TO THE STUDENTS

As digital printing is a rapidly revolving technology, it is very difficult for an education institution to keep up with the latest development in terms of capital investment and staff training. Hence the Centre is an ideal establishment where it will always maintain the latest equipment on the premises. In addition, the suppliers have agreed to offer technical training to the Centre's personnel so that the latter can in term teach the students and professionals in the printing field. The students are the prime beneficiaries of the Centre because they can acquire hands-on experience in using the sophisticated equipment, which will give them a competitive advantage when they enter the job market upon graduation.

BENEFITS TO THE PRINTING INDUSTRY

The printing industry in Hong Kong is currently at the crossroad where important investment decision has to be made regarding the purchase of the advanced digital printing equipment. On one hand they feel it is imperative to move into the "digital era" but on the other hand they are concerned about the lack of properly trained professionals who can master the technology. APTEC can offer the industry training programmes, consultancy and pilot production services. And through a membership subscription programme, member companies may use the Centre's equipment on a trial basis so that they can actually test the performance of the equipment before making procurement decisions.

BENEFITS TO THE EQUIPMENT SUPPLIERS

The application of digital printing technology in Hong Kong is slow compared to other printing centres of the world, hence the equipment suppliers are anxious to expand their presence in this market. By providing the equipment at the Centre, the suppliers may use it as a demonstration centre for their perspective clients. Furthermore, by offering training programmes to the professionals in the printing industry, it will increase their awareness concerning the importance of the technology. Although the equipment at the Centre represents an investment on the part of the suppliers, over the long run, they would be able to recover the cost through the sale of more digital equipment.

CONCLUSION

The establishment of the Centre has created a 3-way winning situation for the students, the printing industry, and the equipment manufacturers. Not only can the industry develop and upgrade their technical know-how in digital printing, students from the Printing Department can also acquire skills and knowledge in using these state-of-the-art equipment, which will definitely improve their competitiveness when they enter the job market. In addition, suppliers may use their equipment at the Centre to educate the industry regarding their products. This kind of establishment creates a partnership model that benefits all parties concerned and the model can be extended to other industries as well.

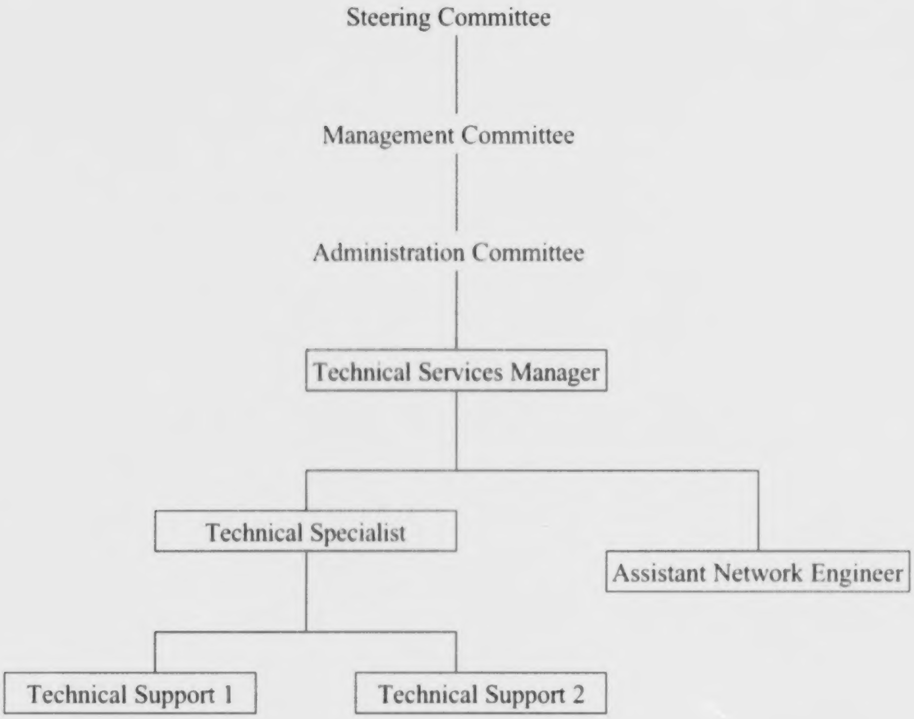
Steering Committee
Management Committee
Administration Committee
Technical Services Manager
Technical Specialist
Assistant Network Engineer
Technical Support 1
Technical Support 2

Figure 1 : Management Structure of the
Advanced Printing Technology Centre (APTEC)

PROFILE OF SME SUPPORT IN HONG KONG AND THE SETTING UP OF THE BUSINESS START-UP CENTRE

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Index: Business Start-Up Centre, Business starters -- Hong Kong, The Management Development Centre of Hong Kong, Small and medium enterprises -- Hong Kong, Small and medium enterprises -- Hong Kong – Support

Abstract: SME business forms the major part of the Hong Kong economy. Over 90% of business establishments in Hong Kong are in this category i.e. employing less than 100 persons. These enterprises in total account for the employment of 60% of the local labour force. Small and medium enterprises, as the economic engine, is a major creator of jobs in all industries.

In January 1999, The Management Development Centre of Hong Kong formally set up the Business Start-Up Centre to help small business starters develop their ideas and business plans.

This paper is intended to give an account on the support given to SMEs by the government and various support groups and the setting up of the Business Start-Up Centre in Hong Kong. The promotional and operational issues encountered during the initial stage of the Centre will be highlighted and an update of the Centre's latest results and new initiatives for the future will also be presented.

SMALL AND MEDIUM ENTERPRISES IN HONG KONG

Small business forms the major part of Hong Kong's economy. About 290,000 or 98% of business establishments in Hong Kong are small and medium enterprises (SMEs)*, i.e. employing less than 100 persons. These enterprises in total account for the employment of 1.4 million workers and provide livelihood to 60% of the local labour force. Statistics also show that each small and medium enterprise on average provides employment opportunity for 5.5 persons. They are the major job creators in Hong Kong. Their performance are crucial to Hong Kong's economic revival and prosperity.

* Small and medium enterprises or "SMEs", as defined by the Industry Dept of the Hong Kong Special Administrative Region are establishments employing less than 100 persons for the manufacturing sector or in the case of the non-manufacturing sector, less than 50 persons.

THE NEED FOR ASSISTANCE TO SMEs AND BUSINESS START-UP COMPANIES

The increase in entrepreneurial activity due to the Asian economic crisis, the difficulties faced by SMEs in the present economic environment and the traditional high rate of business failures in small and medium-sized start-up companies are all factors that have led to the need for the government, support groups in the region and public-funded organisations like The Management Development Centre of Hong Kong to provide due assistance to small business starters such that they can have a better chance to excel and grow their business.

SUPPORT RENDERED TO SMEs BY THE GOVERNMENT AND SUPPORT GROUPS

Recognizing the competitive market that SMEs and business starters are faced with, the government, in partnership with support groups such as statutory bodies, non-government organizations, industrial and trade organizations, introduced a series of government-funding schemes, services and facilities to support the viability of SMEs. The following outlines some of the major initiatives of the government and various support groups in their endeavours to support SMEs in recent years.

GOVERNMENT SUPPORT

In August 1998, the government introduced The Special Finance Scheme to ease the liquidity crunch problem faced by small businesses. Under the Scheme, the government provides guarantee to assist SMEs in securing loans from participating banks and financial institutions. The maximum commitment for the Scheme by the government is HK$5 billion. As funds of the scheme had become fully committed by March 2000, the government ceased to receive new applications for the scheme in April this year.

SERAP (Small Entrepreneur Research Assistance Programme) is another funding programme operated by the Industry Department to help small companies carry out business-oriented research projects at the pre-venture capital stage. Firms are given a grant of not more than HK$2 million. Initially, companies would receive 20% of the sum to do a feasibility test in the first 6 months. Upon the success of this first phase, the project can carry on for another 18 months. Ventures, however, have to repay the grant when it is able to attract revenue.

With an aim to increase the technological capability and competitiveness of the local industry, The Applied Research Fund was established as a venture capital fund which supports the technology ventures of companies in Hong Kong. The Fund is managed by private sector venture capital firms and companies will be assessed on the technical and commercial viability of their proposed technology ventures.

The SME Information Centre established by the Industry Department's Small and Medium Enterprises Office also offers a one-stop information centre on services provided by the government to SMEs. Services include an enquiry service on current services available, a mini-library and computer terminals for free access to the Virtual SME Information Centre.

The Hong Kong Industrial Technology Centre Corporation (Tech Centre) was also set up by the government in 1993 to provide support services to local technology start-ups. The Tech Centre's Technology-based Business Incubation Programme assists small high-tech start-ups to get off the ground by providing them with subsidized rental of office space, operating allowance and a comprehensive package of business services like marketing, management, investment matching and other general services. The Technology Transfer Programme assists local technology companies in sourcing capital and establishing marketing partners and The Seed Capital Funding Services provide funding to high-tech companies through two funding schemes; the Innovation Loan and Early Technology Business Capital Loan.

SUPPORT FROM HONG KONG TRADE DEVELOPMENT COUNCIL

The Hong Kong Trade Development Council, as a statutory organization, provides a range of services which are conducive to the development of SMEs in Hong Kong. Primarily, its SME Service Centre provides trade consulting and business advisory services to SMEs and its "Virtual SME Centre" provides up-to-date business information for small firms on the TDC website. SME Service Stations are also set up in different parts of Hong Kong to help small enterprises access its services and publications and the SME Training Centre was also established to provide a stable venue for training courses offered to small local companies.

SUPPORT FROM HONG KONG PRODUCTIVITY COUNCIL

In December 1997, the Hong Kong Productivity Council also established an SME Centre to enhance the competitiveness of SMEs. The Centre provides services to small businesses in quality management, IT application, business solutions and networking opportunities. Executive seminars and solution workshops are also being organised for SMEs on topics such as IT, operation and business management. A service named ERP (Enterprise Resource Planning) Highway offered by the HKPC also aims to help small and medium-sized companies integrate and automate key processes such as finance, manufacturing and logistics.

SUPPORT FROM THE MANAGEMENT DEVELOPMENT CENTRE OF HONG KONG

The Management Development Centre of Hong Kong (MDC), under the Vocational Training Council, was set up in 1984 with the mission to develop, promote and extend managerial effectiveness in Hong Kong. The MDC also, in recent years, provides assistance to SMEs through developing and organizing training programmes, producing videos and textbooks and offering advisory services to them for improving their skills and knowledge on managing their business.

The Owner Manager Programme, developed by the MDC, covers a great variety of business and management topics such as marketing, finance, accounting, taxation, personal effectiveness, planning, organizing, staffing and controlling. Participants are given the opportunity to seek professional advice from course tutors on problems they encountered in running their businesses.

Realizing the traditional high rate of business failures among business start-ups, the MDC had also developed a comprehensive training programme called "Business Starter Programme" to provide potential entrepreneurs with practical knowledge and skills to evaluate their business plans, carry out market research and conduct feasibility studies so that they are better equipped to start their businesses. It was estimated that a total of 20% of the participants started their business successfully after attending the programme. The success of this programme has also led to the development of a Business Starter Programme on China Business last year for business starters who wish to set up their business in mainland China.

Aside from training courses, the Centre also produces textbooks and videos for the reference and self-learning use of owner managers. In 1995, a book titled 'Case studies in small business management', was published to be used as teaching material and practical reference for owner managers in Hong Kong. The book's real-life cases on small business management in Hong Kong were collected through MDC's own advisory service. A reference book called 'A practical guide for small and medium enterprises' was also published in 1997 to serve as a concise guide to owner managers in business management. More than 30 topics on business operation and management are covered in the book. In 1994, MDC also produced a training video, "Managing Service to Your Customers" for companies in the service sector of Hong Kong. The video is particularly suitable for small business owners and may be used as training material for running an in-company half-day workshop.

In its effort to provide assistance to SMEs, aside from organizing two interest groups for owner managers and business starters in the MDC, namely, the Hong Kong Owner-Manager Association (HOMA) and the Business Starters Association; the MDC also sponsors an interest group called The Hong Kong Chamber of Small & Medium Business Ltd (HKCSMB). The core members of the Chamber are small business owners and those who are concerned with the development of SMEs in Hong Kong.

Owners of SMEs generally find little resources available locally that can help them solve business problems. To improve on the situation, MDC also offers advisory services to help owner managers solve their problems and improve their skills on managing their business.

THE BUSINESS START-UP CENTRE

To provide a conducive business environment for entrepreneurs to test and implement their business plan, the MDC also set up the Business Start-Up Centre (BSC) in early 1999 with the funding from the Services Support Fund. The BSC provides business and professional advisory services, reference materials, training workshops and office facilities at favourable market rate to business starters such that they can keep their operation cost at economic level, thereby supporting them during the initial phase of their business development. It also provides networking opportunities for individuals who are at the early stage of running their businesses.

RANGE OF SERVICES

There are three types of users in the Business Start-Up Centre:

- registered users (without fixed office)
- registered users with fixed office (half-day)
- registered users with fixed office (full-day)

The following outlines the type of services provided at the Centre:

- *Business advisory service*

  Free business advisory service from professionals on law, accounting, finance, marketing and business management;
- *Business and management courses*

  Participation in talks, seminars and training programmes relevant to business start-ups organized regularly by the Centre;
- *Secretarial service*

  Use of secretarial service;
- *Office equipment*

  Use of office equipment including fax machine, computer, scanner, printer, photocopier, mailbox, locker, personalized telephone and conference room;

- *Business Start-up Association*

  Eligibility for membership to the Business Start-up Association to meet business starters in various industries. Other opportunities for business networking are also available from time to time;

- *Reference materials*

  Use of the Centre's collection of reference materials on business start-ups and the vast collection of management resources in the Learning Resource Centre of the MDC;

- *MDS membership*

  One-year free membership of the Management Development Service (MDS) of the MDC.

Since the opening of the Centre, 181 business starters and 110 potential users had utilised the services of the BSC. Over 300 participants had also attended its training activities. A recent user profile survey indicated that business starters utilising the Centre's services are generally engaged in businesses like China trade, import business, web-content design, e-commerce, and consulting services. In March 1999, a customer satisfaction survey had also been conducted to gauge the level of user satisfaction and to identify areas for improvement. The survey results were encouraging and a high level of satisfaction was rated in most areas. Users generally rated an average of 4 or above on a 5-point scale.

The BSC was established at a time when Hong Kong was experiencing great economic recession and a high rate of unemployment. The success of the BSC has proved that starting a new business is a viable option. Since the setting up of the Centre in January 1999, over one hundred and eighty new companies had utilised the services of the Centre. A number of these companies have become successful, drawing on publicity in newspapers, magazines and TV interviews. This has indirectly created an impact on the awareness of entrepreneurship in Hong Kong. A number of organizations have negotiated with the BSC to look for collaborative opportunities such as the initiation of entrepreneurship among young graduates and vocational students and the solicitation of support from financial institutions and venture capitalists.

FUTURE INITIATIVES

As the Business Start-Up Centre has proved to be an initiative welcomed by many potential business starters, to enhance its services, new developments will be tested within the BSC in the years of 2000 and 2001. In particular, since a significant number of BSC users are IT business starters and to fall in line with the government's strategy of providing a conducive environment to high-tech industries, more resources will be invested in the installation of IT facilities and application software in order to better serve the needs of these users.

The experience of business starters of the BSC are undoubtedly valuable reference materials for would-be entrepreneurs in Hong Kong. As one of its future initiatives, the BSC shall develop self-learning videos and workbooks for the benefit of future entrepreneurs based on the past experiences of these users.

The Business Advisory Service of the BSC has also proved to be a useful support service to business starters. This service shall be further enhanced such that more proactive support would be provided through a Mentor Scheme. The Mentor Scheme assists entrepreneurs by assigning several business starters to a Duty Adviser who will act as their mentor or coach. The mentor will meet with his small group periodically and deal with their start-up problems with an aim to ensure that the start-up process is taken off ground smoothly.

A new website promoting the service of the BSC has also been planned for 2001. It is hoped that through better promotion and marketing, the services of the BSC can be broadly utilised.

Lastly, it has also been envisaged that there is the need for the BSC to develop into a forum for exchange of business ideas and a clearinghouse for business opportunities for business starters through regular meetings held at the Centre.

CONCLUSION

The success of the BSC has indicated that such a business model can be considered on a larger scale. With the foreseeable economic revival in the next quarters, it is anticipated that the demand for such services may experience considerable increase. The IT and consulting businesses are viewed as the major market niche for this type of mobile office set-up as spacious offices and lavish funding are not essential to the operation of these businesses and the essence of their success lies mainly in the imagination and generation of new business ideas.

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ATTACH STRATEGIC IMPORTANCE TO HIGH QUALITY VOCATIONAL AND TECHNICAL EDUCATION

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Index: Vocational and Technical Education, Talents, Culture.

Abstract: Xiamen University has been attaching great important to the display of its superiorities and strategic importance to practical technical education for the new century. The University aims at culturing technical and profession personnel to be used in the frontline of production, construction, management and service. In the area of the distribution of courses and reform of teaching contents, the University takes the culture of basic quality and capability of students as the core task, rationally sets up courses, makes conscientiously good teaching planning, improves textbooks, labs and bases for teaching practices. The University has cooperated with nine local enterprises in joint establishment of field trip and training bases. The University encourages engineering and technical staff of enterprises to joint our teaching staff and hires them as the teachers for field trips and training of students. At the same time, the University sends teacher abroad, other units in China or to industries for studies, aiming at building up a task force comprehending both theory and practices.

With development of science and technology and social progress, many professional posts set higher demands on the expertises of their staff. On the other hand, with the enhancement of people's living standard, more and more people seek for higher learning education. The society sets various demands for higher learning talents and a great many professionals will work in the frontlines of manufacturing, service and management. The cultivation of this type of talents depends on the development higher-learning professional education (Wang Mingda,1999). In recent years, with the development of higher-learning education the case of higher-learning professional education has received more and more attention from various lines. Xiamen University is a comprehensive university and enjoys distinct superiorities in teaching taskforce, education infrastructure, faculties, academic level and higher-learning education experiences. In the process of educational system reform, Xiamen University set up its Vocational and Technical Institute in 1999 based on its long term experiences in higher-learning professional education. The Vocational and Technical Institute is an experimental site for vocational and technical education in the university. This paper intends to discuss some issues for raising educational quality of higher-learning professional talents in the areas of cultivation objectives, distribution of expertise, teaching courses and teaching materials, practice and training. Bases and capacity building of teaching staff.

I. Education Objectives

The objectives of education are associated with meeting the social needs. The development of higher-learning professional education meets not only the needs in China's modernization drive but also follows the great trend in higher –learning education in the world. In the new century when the era of "knowledge economy", a state needs not only high quality "academic" talents but also skill technical talents, in order to maintain its sustainable development by relying on its own capacity. The higher-learning professional education is an integrated part and a type of higher-learning education. It is not a type of lower-level higher-learning education, on the contrary, it is a type of education parallel to common higher-learning education that takes "academic education as its objectives" and becomes a part of higher-learning education system in China consisting of professional, undergraduate and graduate education (Wang Hu, 1999). Based on this understanding, we are clear that the objectives of high-learning professional education intend to culture professional talents with advanced applied technologies for meeting the needs in the frontlines of manufacturing, construction, management and services. The students receiving higher-learning professional education should become professional talents meeting the urgent needs in local economic development, tradelines and enterprises.

II. Distribution of Faculties

1. There are two principles guiding the distribution of faculties, firstly social needs and secondary education resource superiorities of a school.

Under the principle of social needs, the distribution of faculties should be made in accordance with the needs of local economy and market demand. The distribution of faculties and number of student enrollment should consider the actual needs of technical areas and professional posts (groups), especially the needs of the local large-scale key industries. In this regard, the broad and narrow faculties should be coordinated and the principle of stability and flexibility should be followed in order to give full play the applicable, new, modern and compound features of professional education. For example, the Faculty of Aviation Engineering in Xiamen University is a one of the key faculties meeting urgent social needs.

Higher-learning professional education has to meet very strong practical needs. This feature urges us to change from depending purely on government budget to relying on the cooperation with tradelines and enterterprises, and from enclosed education to opened education. By making full use of education resources of tradelines and enterprises, higher-learning professional education has embarked on the road of joined education by the cooperation between university and industries.

The education superiorities of a school refer to the superior teaching staff and faculties of Xiamen University, including various labs for undergraduate education. The Vocational and Technical Institute of Xiamen University offers courses similar to close to the undergraduate courses, which have been offered by the university. At the same time, the distribution of faculties has taken into consideration the relationship between diversity and changeability of social needs and relative stability of school educational (Liu Zhipeng, 1999).

By following the above principle, the courses offered by the Vocational and Technical Institute of Xiamen University have not only rich teaching resources but also training fields both inside and outside the school. In addition, the courses meet to a certain degree the needs of employment of the graduated student. Moreover, it makes full use of the teaching resources in the school and decreases greatly education costs.

2. Teaching Steering Committee

In line with the education objectives of higher-learning professional education, Vocational and Technical Institute of Xiamen University has set up in each faculty a Teaching Steering Committee consisting of professors of the associated faculty and technical experts from relevant tradelines and enterprise. The Terms of References of Teaching Steering Committee are to set down the education objectives and basic requirements that meet the social needs, set up course system meeting the law of higher-learning professional education, examine and assess teaching plans, propose recommendations to the development of faculties and design-makings, and participate in the implementation of teaching plans, such as giving lectures and arranging field trips.

III. Course System and Teaching Management

1. Principles in course distribution

The distribution of courses is based on the objectives for culturing special talents of with advanced applied technologies meeting the needs of manufacturing, construction, management and services. The distribution of courses is based on the social expertise needs and analysis of professional posts and pays attention to the culture of professional quality and applied technical capability of students. The course systems bear the features of "taking capability as the core, making social requirements and applicability as the rule." Under this principle, the teaching plans are designed and the teaching programmers developed. The public basic courses aim at applicability and the theoretical education and makes comprehension of concepts and reinforcement of applicability as the key points and "necessity and enough for use " as the rule. The culture of capability in the use of computer network and English is emphases. The course of expertise is arranged by taking into consideration of their practical use and dealing well with the relationship between theory and practices and the theoretical education and field trips.

2. Reform teaching contents

Higher-learning professional education has the dual attributes of higher-learning education and professional education (Tan Songhua, 1999). It is a kind of education that takes technical skill and know-how as the teaching key points. Therefore, the teaching contents meet the needs in the culture of theoretical knowledge and practical capability of students and pay attention to the culture of quality of students and the combination of human science and technical education. In the course of teaching, the contents should be refined, deduction process should be less and capacity building and palpability of students should be made the objectives.

3. Putting emphasis on practical education

As the teaching process puts emphasis on practical education, the ratio of course time between theoretical education and practical education is 0.5 0.5 0.6 0.4 the teaching is organized in forms of course modules. The second feature in this regard is that filed training and trips inside and outside the school receive great attention. Xiamen University has cooperated with nine well-known large-scale enterprises in Xiamen and hired teaching and training teachers from these enterprises.

Since the education of higher-learning professional students is designed based on the professional posts we have clearly specified that a quantified graduate should acquired a professional certificate (post certification) in addition to diplomat. In the practical education, attention is paid in culturing a student's capability in acquiring other certificates.

4. Education management system and education quality monitoring system

A series of strict teaching management regulations have been implemented. The regulations include mid-term education check, teaching monitoring, comments on course development, examination and approval in opening a new course, regulations on course examination, requirements on graduation thesis (design) and regulations on giving a course, changing courses or suspending a course of a teacher. As a result, a rather complete guarantee and monitoring system for education quality has been formed and education quality guaranteed.

IV. Teaching Materials Development

The compilation of teaching materials is based on the theoretical basis and knowledge system involved in the practical work, with special attention to the compilation of the teaching materials for experiments, field trips and trainings. In addition to public courses and basic courses that use the textbooks recommended by the Ministry of Education, we have compiled some textbooks for special courses and used some compiled by other colleges. In addition, we have carried out the following work:

1. Participate actively in the compilation of serial textbooks for higher-learning profession education sponsored by the Ministry of Education and the National Association for Higher-learning Professional Education of Colleges , such as the textbooks for applied writing, computer science, electrics and elecmachenical science
2. By reforming theoretical textbooks, the comprehension of necessary theoretical know-how by students is made as the principle. The textbooks are integrally optimized and combined well with the reform of course system; therefore, the capacity of a student in using technology is enhanced.
3. Textbooks for training and filed trips have received good attention. One way to use foreign textbooks for field trips and training upon some changes. For example, some of the textbooks used in the Faculty of Aeroplane maintenance Service are bought from abroad. In addition, some of the training materials used in the trade lines and enterprises in China are used for textbooks.

V. Capacity-building of Teaching Staff

Xiamen University intends to build up a high level, high quality, capable and stable teaching taskforce for higher-learning professional education. Attention has been paid to select "dual-teaching "teachers from available teaching staff. These teachers have good knowledge of special expertise and rather strong technical skill. The available "dual-teaching" teachers used to work or be trained in the field of various trade lines. The teaching staffs of the Faculty of Law are teachers and concurrently lawyers. Most of the teaching staffs of the Faculty of Aeroplane Maintenance Service are recommended by HAECO and TAECO and have participated in the workshops and training sources sponsored by civil aviation institutions at home and abroad. In addition, they all have visited or studied in HAECO. We are now taking the following measures for improving the quality of our teaching staff.

1). To encourage the teachers qualified for "dual teaching " to transfer to the post for higher-learning professional education.

2). The teachers selected or hired for higher-learning professional education should have education level higher than master. Priorities are given to that with doctor degree and masters qualified for "dual teaching".

3). To develop a system urging teachers to participate in practical work, technical development and follow-up study.

4). To hire experts and technical staffs from trade lines and enterprises as the part-time teachers and field trip tutors.

5). To form a system for assessing and hiring teaching post for higher-learning professional education.

6). To develop a mechanism for cultivating and selecting faculty leaders and teaching backbones for higher-learning professional education and send them for follow-up studies in the regions or countries that are successful in the development of high-learning professional education.

7). To encourage enterprises at home and abroad to set up Education Funds in the Vocational and Technical Institute.

In addition, we hire managers and technical staffs of tradelines and enterprises as our part-time teachers in line with the development and faculties and education needs.

VI. Development of Bases for Training and Field Trips

1. Improve and perfect the bases for training and field trips inside the school

Xiamen University has a reulation in running higher-learning professional education, namely no enrolled should be made until the bases for training and filed trips inside the school is built up. However, in comparison with the bases for training and field trips outside of school, those inside school are old in facilities and imperfect in their functions, backward in technological level. It is decided upon studies that a great input should be made to improve and perfect the bases for training and field trips inside school.

2. To develop training and field trip bases outside of school are relying on trade lines and enterprises

Xiamen University has jointly built up " Out-School Training Bases for Higher-learning Professional Education of Xiamen University" by cooperating with some well-known enterprises and trade lines. The first group training bases have been set up in nine enterprises, including Xiamen Taikoo Aeroplane Engineering Lt. Co., Air Xiamen Lt. Co. Xiamen Overseas Electronics Lt. Co. and Xiamen Tourism Group Lt., Amoisonic Electronic Lt. Co., the Customers Service Center of United States DELL Computer (China) Lt. Co., Xiamen Fala Development Lt. Co. Xiamen Tourism Group, Xiamen Jingmin Hotel and Xiamen Siming District Court. These are all large scale backbone enterprises and units in Xiamen.

3. Following the road of combining education and industries and build up teaching factories (workshops) and centers

As higher-learning professional education puts more emphasis on the practical capability of a student, Xiamen University intends to invest and build an electronics manufacture for the module of electronics, a workshop for the Faculty of Building Materials and Plastic Processing, improve a simulation court for the Faculty of Law and a simulation lab for stock exchange for the module of finance.

4. Training and field trip programs

Training and filed trip programs are developed in accordance with greater social needs for some work posts and talents and the development in higher-learning professional education inn Xiamen University. We plan to build several integrated training bases for multidisplinaries and several centers for special field trips in the form of cooperation between Xiamen University and industries. The teaching facilities of these centers or bases should be up to the advanced level among the trade in China.

We must have a clear understanding of the phrase that "higher-learning professional education is an important part of higher-learning education." We must transform our sense of education and understand that higher-learning education is a "whole life education " instead of "final education." Higher-learning professional education is a type of whole life education. In this regard, how the state key colleges play their important role in higher-learning professional education by making use full of their education resources? It is an important issue needs earnest studies. We are intending to make our due contribution to China's reform in higher-learning education by engaging in higher-learning professional education.

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DEVELOPING A COMPETITIVE PROGRAM TO COPE WITH THE 3C(CHANGE, COMPETITIVE, COMPLEX) TREND IN INDUSTRY

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Index: Competitive advantage, Performance of manpower, Training and development, Training program, Training curriculum, Employee development

Abstract: Facing the 3C trend – **C**hange rapidly, more **C**ompetitive, highly **C**omplex in the industry, it is important issue that how organization can anticipate the tendency for the business, cope with violent change in the fast pace, and take a proactive & strategic action to achieve the competitive advantages. The purpose of this study indicates the program setting designed for different employee according to different requirement and characteristics of job.

It is apparent that keeping capability growth and progress in the performance of manpower and achievement of operating profit which depend both on the development of individual employee and whole organization.

By the serial planed program and curriculum for human resource development, all employees will get a set of "ability diagnosis" first, and then take a drafted program suite for the individual. Obviously, the advantage of competition for organization emphasize on the promotion of the competency for his individual from top to bottom in company.

In the paper, it will explore a programming plan and demonstrate a set of curriculums in a practical example to expose how to design and implement a program for competent manpower.

INTRODUCTION

We know that any organizational training strategy based on prescriptions depending on the sector, product, service and workforce expectation of the organization concerned. Training and development activities would deliver the required knowledge, skills and attitude to fit the achievement of corporate object. And it would be seen as a vital factor influencing the operational performance of organization.

We know the contribution of employee development is

- The highlights of the contribution made by training
- To link with the total strategy containing marking, product engineering, manufacturing systems engineering and business systems

- To evidence the top- management commitment
- To play the role in developing the competitive achievement plans
- To underpin business task forces

How to combine the training and performance?

Organizations have the viewpoint of recognizing that the training and development is a strategic priority rather than a tactical response.

Figure1 How to plan a strategic training and development

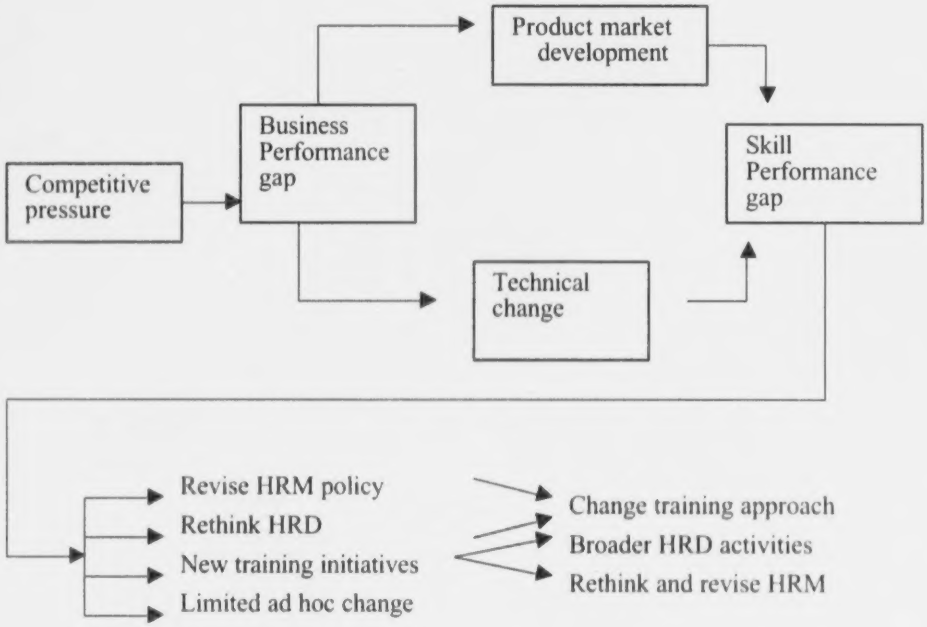
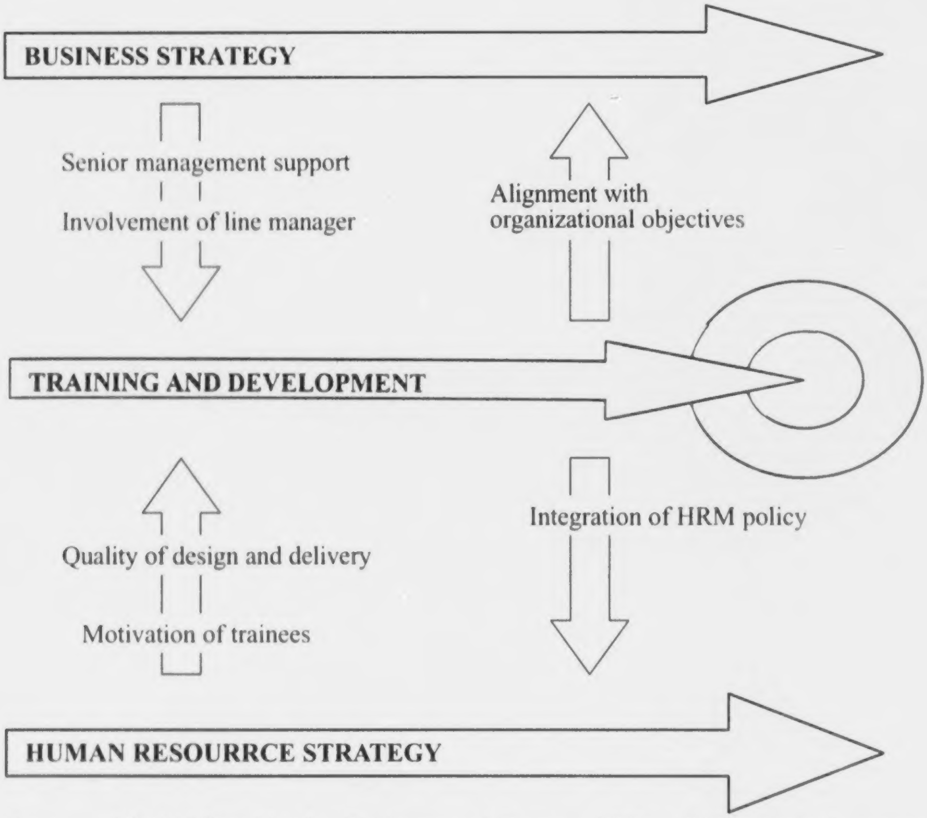

Product market development
Business Performance gap
Skill Performance gap
Competitive pressure
Technical change
Revise HRM policy
Rethink HRD
New training initiatives
Limited ad hoc change
Change training approach
Broader HRD activities
Rethink and revise HRM

Figure2 Links between business performance and human resource responses


BUSINESS STRATEGY
Senior management support
Involvement of line manager
Alignment with organizational objectives
TRAINING AND DEVELOPMENT
Integration of HRM policy
Quality of design and delivery
Motivation of trainees
HUMAN RESOURRCE STRATEGY

Source: Adapted from Hendry, Pettigrew and Sparrow, 1988, p. 41The strategic purpose of training and development.

The manpower development plan mean that corporate attempt to revise overall human resource management, and to embrace such things as recruitment, reward schemes, reducing attrition, enhancing accountability.

Another strategic purpose of training and development is to play as a catalyst for change. To fit the purpose, we need to take account of

- the quality of training
- the context of training
- the scope of training

It is easy to change external manifestations of culture; and it is far more ambitious to change the ingrained attitudes and norms for employees. What important is the way management development: not only upgrade skills but also to structure attitude.

The third purpose of training and development is an endeavor to get the organizational competitive edge, by the means of the content of activities and the way delivered. More and more organizations practice human resource strategy as a approach of integrating their business plan with organizational development.

The forth purpose of training and development is to encourage a learning climate in the organization. The focus is on the learning needs of employees, directed by organizational goals. The training approach is away from structured, taught courses, but tend to enhanced opportunities for self-development.

The essence of training needs is a comparison between what is and what should be. Instruction is a way of narrowing the gap between condition and criterion when the deficiency is caused by lack of knowledge or skill.

Some data collection methods can be used to contrast condition and criteria for training needs assessment, including: (1)interview, (2)survey, (3)observation, (4)task analysis, (5)performance evaluation, (6)assessment center, (7)group discussion, (8)critical incident techniques, (9)delphi procedure, (10)nominal group techniques.

Analysis of functional strengths and weaknesses provides insight into what contribution should be making to corporation, what resource should receive.`The analysis of past or present strengths and weaknesses is not sufficient for meeting future learning needs. Future analysis is necessary and essential.

The following chart demonstrates the key factors considered for instructional needs assessment of corporation.

Figure3 Instructional needs assessment

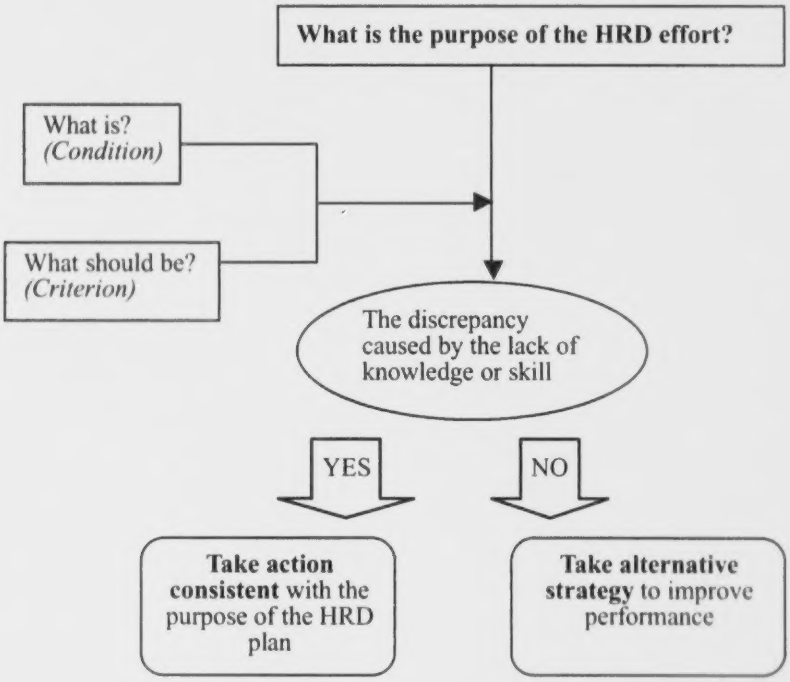
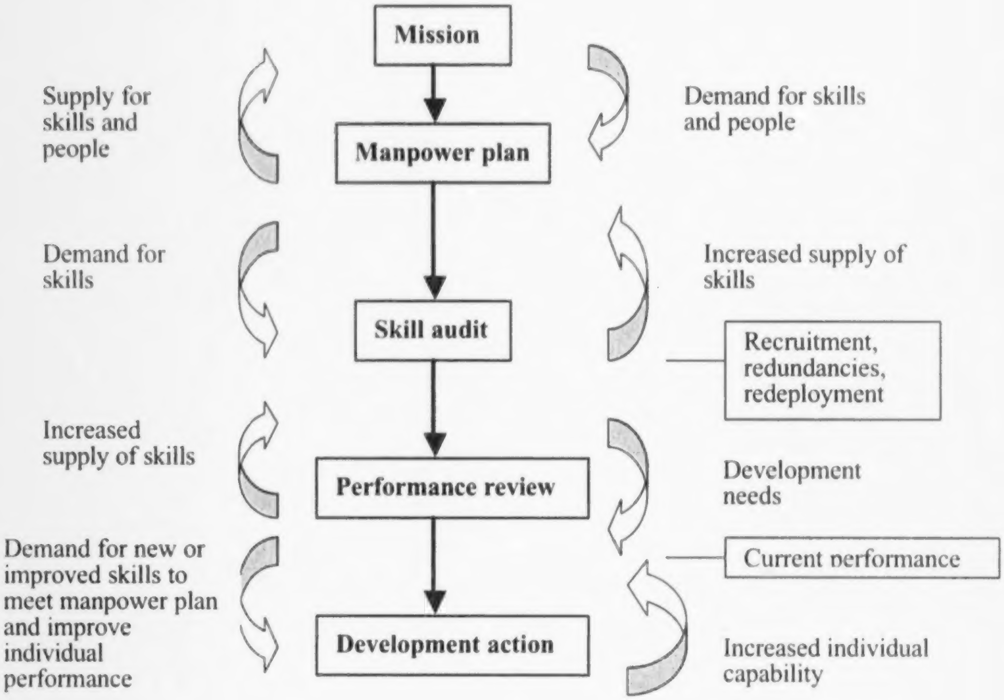

What is the purpose of the HRD effort?
What is?
(Condition)
What should be?
(Criterion)
The discrepancy caused by the lack of knowledge or skill
YES
NO
Take action consistent with the purpose of the HRD plan
Take alternative strategy to improve performance

Figure4 Linking employee development and organizational mission


Mission
Manpower plan
Skill audit
Performance review
Development action
Supply for skills and people
Demand for skills and people
Demand for skills
Increased supply of skills
Recruitment, redundancies, redeployment
Increased supply of skills
Development needs
Current performance
Demand for new or improved skills to meet manpower plan and improve individual performance
Increased individual capability

Source: Christopher Mabey, and Graeme Salaman(1995), *Strategic Human Resource Management*

Figure5 The practical implement for employee development

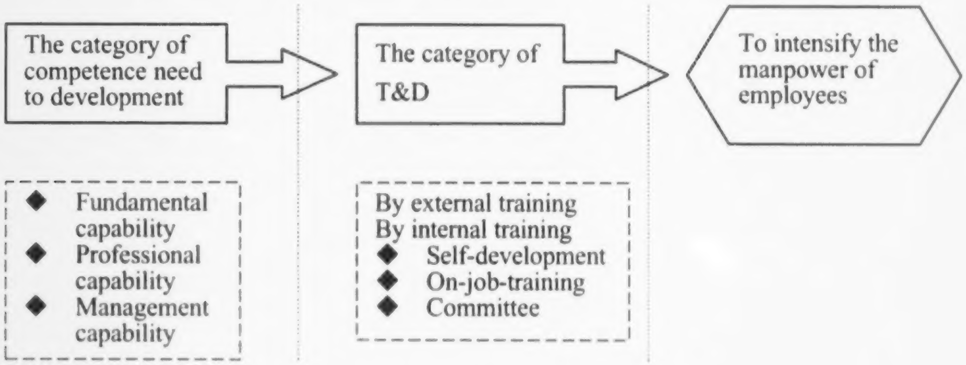
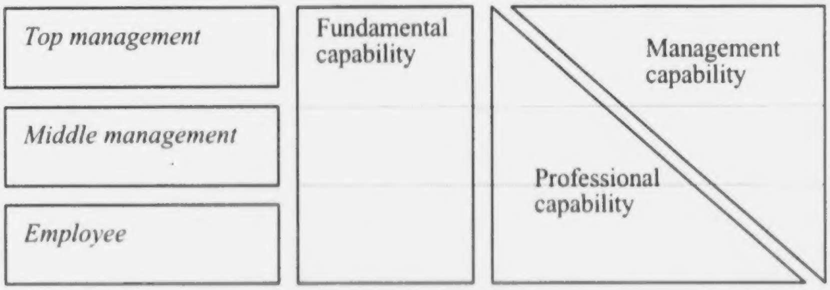

The category of competence need to development
The category of T&D
To intensify the manpower of employees
◆ Fundamental capability
◆ Professional capability
◆ Management capability
By external training
By internal training
◆ Self-development
◆ On-job-training
◆ Committee

Figure6 The capability category for employee development



The transformative environment

In the past decade, many organizations altered the way they operate their environment. Increased competition impelled many corporations to downsize, more efficient, and flexible, and pushed corporations to proactive the tendency of 3C.

Organizational transformation implies radical changes in how they perceive, think, and behave.

We are concerned with the assumptions underlying how the organization relates to its environment and shifts to its business operational philosophy. The effective training and development would reflect both the trategic priorities of the business as well as the aspirations of the individuals.

CONCLUSION

There are an explicit attempt to match the business plan and employee management at all business level. Training and development program provide the vital linkage between corporate strategy and HRD policies.

To enhance the capability of training function, we should internalize and integrate the knowledge supplying by external expert. By means of those steps described in forward content, we could craft and design a competitive program to proactive the needs of employee development and to meet the path of corporate development, as well as response to the tendency of transformative environment.

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HOW EFFECTIVE ARE OUR TEACHING METHODS FOR VOCATIONAL EDUCATION

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Keywords: Attitude, affective domain; questionnaires; experimental research

Abstract : In vocational education, students' attitudes are often overlooked in its pedagogy deployment. The theme of this paper is to investigate how to measure the effectiveness of teaching in student's affective domain.

The research experiment was designed with time-span of 15 weeks. A set of questionnaires was designed as the instrument of the investigation. Prior to the experiment, students were split into two groups. Subsequently, these two groups of students went through different approaches of teaching. At the end of the experiment, the same questionnaires were used to probe students' attitude. Data analysis was used to measure the shift of attitude before and after the experiment of these two groups of students.

Apparently, one group of students has more positive attitude. However, data analysis shows we cannot conclude it was caused solely by imposing one particular teaching method. Likewise, even with the fact that many students of the experimental group favored one particular type of teaching method, there is no evidence that this teaching method can have higher impact in students' attitude. This study provides a useful viewpoint in the planning and evaluation when conducting a novel teaching methodology.

1. Background of teaching and learning in HKIVE

The Department of Electrical & Communications Engineering (Dept. of EE) at Hong Kong Institute of Vocational Education (HKIVE) has offered several Higher Diploma courses since the opening of the Hong Kong Technical College (now as HKIVE) in 1993. Conventional lectures and tutorials are the major means of these taught courses. In many lectures, class-size of 80 students is common. In some cases, there are lectures with as many as 160 students.

In this type of teaching, lecturers are the only people who do most of the talking in lecture theatres. In fact, many students feel bored in this type of one-way communication. In many cases, students have expressed strong resentment. It was felt that some alternatives might be used to enhance the learning outcome of the students at HKIVE(TY).

2. Lab-based teaching

Over the past decade, teaching methods in the courses that involve engineering disciplines have evolved significantly beyond the "lecture & laboratory" format. Experience has shown that, for effective teaching of many science and engineering subjects, practical exercises in the form of laboratory exercises need to be an integral part of the courses [1,2,3]. In particular, computer usage in the laboratory and computer-assisted homework has been very successful. Students have found that learning difficult concepts can be done more effectively when those concepts can be presented and explored visually or in a form for experimentation.

Laboratory approach teaching seems to be the natural alternative. Essentially, lab-based teaching makes use of a heuristic approach to learning which advocates "I see – I forget; I hear – I remember; I do – I understand". Learning by doing is a common teaching and learning method: "active learning" is an essential part of student-centered learning [4]. To make the coordination between the practical and theoretical work better, it is believed that lab-based teaching can provide the integration and it can deliver as part of the course plan. In this way, lab-based class can well integrated according to an overall course plan.

The activities of lab-based teaching/learning are largely student-based and monitored by instructors. It also emphasized small group teaching and learning in which students are encouraged to organize their thinking by comparing ideas and interpretations with each other and to give expression, and hence form, to their understanding of a subject. The role of the lecturer/instructor seems to be particularly critical in the lab-based teaching.

Using lab-based approach to teaching, students spend a considerable proportion of their time in the laboratory. During the exercise, it is effective for students to establish a positive attitude toward their professional in an environment similar to that of their future workplace.

3. Questionnaires – measurement of attitudes

In vocational education, students' attitudes are often overlooked in its pedagogy deployment. The theme of this paper is to investigate the effectiveness of teaching in student's affective domain by comparing the shift of attitude of two groups of students. The overall design of the experiment consists of the following steps and it can be depicted in Figure 1[5,6].

	Time →	→	→
Group under investigation	T1	X	T2
Control Group	T1	Y	T2

Where T1 : Questionnaires administrated to all students
T2 : Questionnaires administrated to all students
X : lab-based teaching
Y : conventional teaching

***Figure 1**: Overall design methodology*

Questionnaires are the principal instruments used in attitude measurement. The measurement of attitude can be done by the levels of agreement with a series of statement are combined to give an attitude score.

4. Likert scale

In constructing a questionnaire, one wants to use scales at the *interval* level or at least *ordinal* level whenever possible[7,8]. All of the more powerful techniques of statistical analysis demand such scales, rather than simple *nominal* measures. One of the most frequently used ordinal-type scales is a single item (question) on a Likert-type scale. A Likert-type item consists of a single statement, followed by a usually five-point choice with each choice described in words. A common response in Likert-type scale are choices from Strongly Agree (SA), Agree (A), Uncertain (U), Dis-agree (D) and Strongly Disagree (SD). These responses are mapped with score from 1 to 5. Respondents are presented with questionnaires in which they use a choice to indicate how well the choice matches their feeling about the concepts. The measurement of attitudes is usually based on a form of attitude scale which levels of agreement with a series of statements are combined to give an attitude score. That is, the total attitude score is the **sum** of the individual question scores.

5. Design of questionnaires

It is desirable to know whether there is shift of attitude toward two main concepts: "engineering lesson in HKTC" and "engineering as a profession". Subsequently, a questionnaire with 26 questions was designed to probe the students' attitudes towards these two concepts. The questionnaires consist of two sections. The first section is attitude toward engineering lesson at HKTC. Student's attitude is measured with a set of 11 questions. These questions are measured in Likert-type scale and they are corresponding to a 5-point scale. The attitude score is the total of these responses. As shown in Figure 2, 11 items with Likert-type scale are used and sample's scoring of each question in tallying the composite attitude score. A problem with the Likert technique is the modest attitude score can be obtained by many patterns of response such as giving middle scores on all items. In constructing Likert-type and similar scales, some of the items should be positive and others should be negative. It is used to avoid "response-set". Noted that four of them are negative questions and they are marked with asterisks.

1. There is usually sufficient equipment and materials
2. Students put a lot of effort into what they do
3. The lectures lessons are well organized
4. The tutorial lessons are well organized
5. The laboratory lessons are well organized
6. Student waste time doing nothing in laboratory (*)
7. Most students really pay attention to what the lecturer says
8. Very few students take part in class discussions (*)
9. Student don't do much work in lab (*)
10. Because equipment is scarce, students don't get much practical work completed (*)
11. Student really enjoy their lessons

Figure 2*: Questionnaires to probe students' concept of a engineering lessons at HKTC. (note : questions in asterisk are negative questions); Answer with choices of SD, D, N, A, SA.*

The second section is to measure their attitude toward engineering as profession. A total of 15 questions are asked in *semantic differential* scale from 1 to 5 and details are shown in Figure 3. The first survey was done before the experiment. Another survey with the same questionnaire was carried out to identify any change of attitudes from these two groups of students.

A job working in Communications Engineering Area is						
Interesting	1	2	3	4	5	Boring
Make you tense	1	2	3	4	5	Make you relaxed
Successful	1	2	3	4	5	Unsuccessful
Unfriendly	1	2	3	4	5	Friendly
Modern	1	2	3	4	5	Out-of-date
Safe	1	2	3	4	5	Risky
Difficult	1	2	3	4	5	Easy
Requires work in a team	1	2	3	4	5	No team work required
Demanding	1	2	3	4	5	Undemanding
Requires much experience	1	2	3	4	5	Requires no experience
Technical	1	2	3	4	5	Non-technical
Non-specialized	1	2	3	4	5	Specialized
Active	1	2	3	4	5	Passive
Useful to others	1	2	3	4	5	Not useful to others
Involves much responsibility	1	2	3	4	5	Involve little responsibility

Figure 3: Questionnaires to probe students' concept of a job working in communications engineering area.

6. Summary of results

The first part of the questionnaires concerned with students' perceptions in the matters of engineering lesson. The summation of 11 scores of Likert scales to make up a "attitude score". After the completion of the experiment, as shown in Table 1, we can observe that attitude score of experiment group (Group B) changed from 33.83 to 35.58 while the control group's attitude score changed from 31.33 to 32.67. Details of the data analysis indicated the significance of these are 0.166 and 0.533. This means that there is a high chance that pretest and posttest attitude score are effectively equal.

Likert scale	control		experimental		t-value	2-tail significance
	mean	std	mean	std		
pretest (1,2)	31.3333	4.416	33.8333	2.368	-1.68	0.110
posttest (3,4)	32.6667	4.472	35.5833	3.502	-1.68	0.110

***Table 1**: Summary of data analysis (comparing the effect of the treatment)*

In the second part of the questionnaires, another 15 questions were used to probe students' attitudes toward engineering as a profession. Data analysis was carried out to test whether there is a shift of attitude after the experiment and the results are shown in Table 2. Although each question uses the same semantic differential scale, they represent different concepts. Thus, the data from each of the 15 questions are analyzed separately. In this analysis, t-test was carried out to test whether there was shift of attitude toward engineering as a profession. The lowest probability value from these evaluations is 0.075. None of these has a 2-tail significance lower than 0.01 (i.e. $p > 0.01$). It was concluded that there were no significant differences in students' attitude after the experiment.

Question	Pretest		Posttest		t-value	2-tail significance
	Mean	STD	Mean	STD		(p)
Q12	2.8333	0.718	2.7500	0.622	0.30	0.764
Q13	2.4167	0.515	2.8333	0.577	-1.87	0.075
Q14	2.6667	0.778	2.8333	0.577	-0.60	0.557
Q15	3.6667	0.651	3.0000	0.853	2.15	0.043
Q16	2.9167	0.669	2.4167	0.793	1.67	0.109
Q17	2.2500	0.754	0.2533	0.669	-1.15	0.264
Q18	2.6667	0.778	2.7500	0.452	-0.32	0.752
Q18	2.6667	0.778	2.7500	0.452	-0.32	0.752
Q19	2.3333	0.651	2.3333	0.651	0.0	1.00
Q20	2.7500	0.754	2.5000	0.522	0.94	0.355
Q21	2.7500	0.754	2.4167	0.669	1.15	0.264
Q22	2.6667	0.888	2.5000	0.522	0.56	0.581
Q23	3.0000	0.426	3.1667	0.718	-0.69	0.496
Q24	2.5833	0.669	2.6667	0.651	-0.31	0.760
Q25	3.0000	0.426	2.7500	0.622	1.15	0.263
Q26	2.7500	0.754	2.7500	0.452	0.00	1.000

***Table 2**: the pretest and posttest result of the **experiment** group. All indicates there is no sign of significant that each pairs are different (i.e. $p > 0.05$)*

7. Analysis of the teaching methodology

The measurement of affective outcomes or evaluative judgment is usually based on a form of attitude scale of the respondents. Attitude scales, like other scales, need to be reliable and valid. There are many problems associated with the attitude measurement[7,8].

After the study, it was found there is only similar minor shift of attitude in both groups. We have little evidence that the change of attitude is due to the difference of teaching methodology. Again, we cannot make the conclusion that shift of attitude is due to lab-based teaching.

Ideally, the lab-based approach to teaching should emphasize learning and not teaching. Students are not working alone as they can build their own understanding under the guidance of instructor. There have been conflicting findings on the comparative effectiveness of laboratory based and lecture methods. Some research found no difference in cognitive achievement of learners

[9]. But other studies found that the lecture method was inferior to instruction based on problem solving, laboratory approach teaching.

Some of these findings therefore suggested that laboratory based method, could be effective in improving the achievement of students in science and engineering [9,10,11,12]. Researchers also suggested that students' perception to laboratory approach teaching will be more positive if they wish to solve the problem [13]. The results shown above simply reflect the outcome of this experiment. Many students also reflected their views that computer-assisted homework imposed many difficulties in assessment. As suggested by Morgan, assessment is one of the major factors that will change students' perception and approach to learning [14].

CONCLUSIONS

In this paper, some of features of lab-based teaching methodology are discussed such as "learning-by-doing" and the emphasis of student-centered principle. Although the author cannot conclude there is a significant in shift of attitude after imposing the lab-based teaching, some advantages of laboratory approach teaching were experienced. They are summarized as:

1. Lab-based class can well integrate according to an overall course plan;
2. Activities of lab-based teaching/learning are largely student-based and monitored by instructors; and
3. Lab-based teaching may be effective for certain students to establish a positive attitude toward the professional but may not be as effective for others.

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USING QUALITY INDICATORS TO CREATE WORLD CLASS CURRICULA: FROM CONCEPT TO APPLICATION

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Index: Curriculum Quality Indicators, World Class Workplace,VET Curriculum Development, Higher Vocational Education

Abstract: In this paper, Curriculum Quality Indicators (CQIs) are described including what they are, how they are developed, and how they can be used to help create curricula that meet world class employers' needs. The world class workplace is presented as a frame of reference for curriculum quality. Next, details about how a set of CQIs was developed is described. The application of CQIs to a comprehensive curriculum project at Helsinki Polytechnic in Finland is the detailed. Several implications are offered for CQI use in vocational higher education curriculum development.

OVERVIEW AND PURPOSE

One particularly vexing problem associated with VET curriculum design and delivery is the selection of curriculum outcomes that are of value to all stakeholders. This is of major importance for curricula that focus on preparing people for employment in high performance workplaces, world class workplaces, and other workplaces where every work day brings with it another change, a different challenge, and an opportunity to learn something new. In these environments, employees may work in self-directed teams and solve complex problems extending beyond traditional country and cultural boundaries (Finch & Dettmann, 1999). This continuously evolving work environment reflects what Spady (1994) refers to as a transformational zone where employees are expected to demonstrate complex role performances in real-world contexts. Traditionally, work performance of this type has been considered beyond the scope of formal education. But with the evolution of more complex work environments where complex, multi-faceted demands are placed on employees; educators can no longer continue to just provide their students with the development of "discrete content skills, structured task performances, and higher-order competencies (Spady, 1994, p. 21). When Curriculum Quality Indicators (CQIs) are used as part of the curriculum creation process, they have the potential to help move educators and others into transformational zones where they can focus their curricula on today's and tomorrow's increasingly complex world class work environment. The purpose of this paper is to describe

Curriculum Quality Indicators: what they are, how they are developed, and how they can be used to help create curricula that meet world class employers' needs. First, the world class workplace is presented as a conceptual frame of reference for curriculum quality. This is followed by a description of how a set of CQIs was developed. Then, the application of CQIs to a comprehensive curriculum project at Helsinki Polytechnic in Finland is described. Several implications are offered for CQI use in vocational higher education curriculum development.

CURRICULUM QUALITY INDICATORS: CONCEPTS

A Frame of Reference for Curriculum Quality

Over the past several decades, many businesses and industries throughout the world have been faced with the need to change from traditional workplace arrangements to workplaces that compete head-to-head with world class competition. With reference to the United States, the National Alliance of Business (1999, 1) noted, "rapidly changing technology, the globalization of markets, and other changes sweeping through the U.S. economy mean that our long held assumptions about the economy and business are changing." In response to a need to be more competitive, numerous organizations have shifted focus from a traditional workplace model to a world class workplace model. This shift has caused employers and their employees to change the ways they are organized and function. Changes have occurred internationally in fields ranging from hospitality and tourism to "fast" food and other areas of retail sales, however, they have most dramatic and far reaching in the manufacturing and information technology (IT) fields.

What is the World Class Workplace? An extensive examination of Internet sites and text-based publications resulted in at least a partial answer to this question (Finch & Dettmann, 1999). Definitions may vary from employer to employed depending on what is produced, provided, or sold. However, the concept and its application are perhaps most important than the name. The world class workplace can be more transparent, by serving as the ultimate objective of a long term TQM effort or the real reason behind seeking registration as an ISO 9000 organization. It can also take the spotlight, such as a company or organization that prepares a mission statement announcing "we meet customers' needs worldwide" or "we prepare our graduates for employment in world class businesses and industries." Lacking a simple definition, it is perhaps best to offer several commonly used descriptors. Thus, the world class workplace:

- can be found in a variety of workplaces including but not limited to those engaged in manufacturing, production, marketing, distribution, sales, service, education, and training.
- can be integrated and correlated with TQM and/or ISO 9000 activities.
- depending on the focus of organization, can include just-in-time delivery, performance specifications, mass customization, continuous quality improvement, and similar types of activities.
- can engage employees in flexible work assignments; group planning, problem solving, and decision making; team building, and similar types of activities.
- expects employees to utilize a wide range of interpersonal, academic, and technological skills; understand what occurs in the workplace as a whole; and demonstrate similar types of talents.

Ultimately, the world class workplace makes creative and extensive use of numerous human resources, materiel resources, quality and productivity activities, and related strategies to systematically maintain a competitive edge in the global work environment.

Evolution of the world class workplace may be found in many work fields but change has been perhaps most graphic in the manufacturing field where lean production has displaced traditional mass production processes. Essentially, lean production has as its goals lower cost and higher quality production. However, it is the production process that achieves these goals. Included in the lean production setting are just-in-time delivery of parts, use of performance specifications for parts, an assembly line that any worker may stop at any time and, most important, focus at all production levels on continuous improvement. In some cases, the assembly line form of production has been completely eliminated (Ellegard, Engstrom, & Nilsson, 1991). Lean production workers function as members of production teams, have flexible work assignments, and are expected to initiate improvements to production rather than merely reacting to problems (Womack, Jones, & Ross, 1990). Unlike the mass production employee, the lean production worker is expected to work as a team member, perform a wide variety of activities and tasks, participate in group problem-solving sessions, and otherwise contribute to the total production process and the quality outcomes of that process. This employee is expected to be proactive, have a grasp of the entire production process, and have a solid grounding in basic skills (i.e., mathematics, science, communication). Mastery of these basic skills enables the worker to more readily adapt to changes in the workplace. Realistically, this new type of worker should arrive at the workplace with these basic skills, as well as others such as interpersonal relations that contribute to success in the lean production environment. In a number of cases, lean production has evolved into mass customization; an organic organizational structure that has enabled businesses and industries to achieve "low costs, high quality, and the ability to make highly varied, often individually customized products" (Pine, Victor, & Boynton, 1993, p. 111). Mass customization has made it possible for more and more companies to compete on the world marketplace.

CQI Description and Development[1]

Given the increasing complexity of the workplace and the evolution of its focus from local, state, and national to world class competition, a need exists to extend beyond the strict reliance on curriculum development methods that identify important tasks and skills. The complex nature of workers' roles in the world class workplace demands that VET curricula be designed to prepare graduates so they will function in new and complex ways. Briefly stated, CQIs may be considered as the "super glue" that binds curriculum components together such that quality can be assessed both comprehensively and in the long term. Indicators can assist curriculum developers to obtain a macro view of the curriculum and thus see how the curriculum they are developing or revising can best contribute to students', graduates', and employers' expectations (Finch, 1993). One example of CQI development began over 20 years ago when a book on curriculum development was first being prepared. At that time it was felt important to include in the book a set of overarching qualities that would aid curriculum developers in going beyond the process-oriented goals found in most traditional curricula. As newer editions of the book were prepared, the qualities were examined and refined based on input from curriculum developers and others in the US and 10 other countries (Finch & Crunkilton, 1999). When working during the fall of 1993 with developers of curricula at Jyväskylä Polytechnic (at that time a new vocational higher education institution in Finland) the list of qualities was expanded and quality indicators were prepared. Persons at the polytechnic who used the CQIs felt they aided in focusing on more critical curriculum concerns and outcomes. Subsequent use of the CQIs in interviews with persons in VET institutions in four different countries further supported the indicators' value. Although refinement continues, the CQIs constitute a useful way of determining what curriculum quality should be and how it can be implemented.

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[1] A list of CQIs that link with the world class workplace may be obtained from Curt Finch <crfinch@vt.edu>.

CURRICULUM QUALITY INDICATORS: APPLICATION

Helsinki Polytechnic

The Finnish higher education system consists of polytechnics and universities. At the beginning of the academic year 2000-2001 the number of permanent polytechnics in Finland will rise up to 29. Helsinki Polytechnic was established in 1996 by merging eight existing institutions of higher education maintained by the City of Helsinki. The new organisation was officially launched 1 January 1999 when these separate institutions were abolished. The process was completed by adding four new institutions, the last two in August, 2000. All these institutions, at present integrated, had long traditions in teaching, with experience going back many decades. They educated competent engineers and nurses, among others. Before the integration, guidelines for developing curricula followed traditional curricula theories; for example, in the field of technology they were close to German Lehrplan and in the social services Anglo-Saxon traditions. As one of the largest polytechnics in Finland, Helsinki Polytechnic has over 6,000 full-time students and close to 900 part-time students. Helsinki Polytechnic has three faculties: Technology and Transport, Health Care and Social Services and Cultural and Services. Helsinki polytechnic awards professionally orientated higher education degrees, which take 3.5-4.5 years to complete (140-180 credit units). The structure of all degree programs consists of basic studies (common and discipline-specific), professional studies, practical training, language studies, elective studies and final project (Bachelor's thesis).

The Faculty of Culture and Services offers studies in seven (7) degree programs from Beauty Care and Catering Services to Media, from Drama and Theater to Pop/Jazz and Classical Music. At the Faculty of Health Care and Social Services Helsinki Polytechnic is proud to offer students studies in all the degree programs available at the Finnish polytechnics. Studies in fifteen (15) degree programs include e.g. Nursing and Health Care, Occupational Therapy, Optometry and Oral Hygiene. The five (5) degree programs at the Faculty of Technology and Transport include Electrical Engineering and Telecommunications, Mechanical Engineering, Civil Engineering, Automotive Engineering and Laboratory Sciences (Helsinki Polytechnic, 2000).

Helsinki Polytechnic intends to be internationally acclaimed for the high standards of its educational programs whose students become employed immediately after graduation. The strategic aims of Helsinki Polytechnic consist of enhancing the polytechnic's international activities, improving the level of professional expertise, increasing the cooperation both inside the organisation and with its partners, and developing the urban culture in Helsinki.

Curriculum Development, Phase 1 (1999-2000)

The institutions of higher education that formed Helsinki Polytechnic brought with them different traditions and approaches to developing curricula. Thus, a project was launched in 1999 to determine common aims and strategies for all the curricula and to improve their quality. The purpose of this project was to ensure that each curricula for each of the 26 degree programs would offer students the necessary skills and capacities to work as solid experts of their respective fields in current and future international labor markets (world class workplace). A project team was appointed to take the responsibility for organizing the project. Also, one of the lecturers in each degree program was put in charge of a working group formed to examine and revise that curriculum . Assigned lecturers led groups of 3 to 6 other lecturers. In total, close to 180 lecturers were actively involved in the project. The main working methods during the project consisted of systematically organized discussions between staff members at the polytechnic, its different units, students, and partners in the working life.

As the project began, it was important to form a common view on the notion of a curriculum. The basis for this was the presupposition that a curriculum should be the fundamental framework for all activities within the polytechnic. Thus, this does not mean only writing down the curriculum but also judging its effective implementation and conducting continuous improvement. From the beginning, the aim was to create common terms and concepts to use for all the curricula without forgetting the special features and expertise of each degree program. This was essential for realizing the requirements set by future working life and enhancing the possibilities to meet them.

Next, it was necessary to define three strategic aims for developing the curricula. They included:

1. The curricula will meet the requirements set by future's working life and area of operation and act according to them. Thus, the critical factors for attaining this involve: activities based on ethics, responsibility and commitment; team work skills and know-how; expert knowledge; information processing; sustainable development; entrepreneurship and internationality.
2. The curricula will be based on solid expertise of each field and they provide students the means to work as experts. This involves basing the curricula upon the most recent and essential information of each field, accentuating the logic in contents and continuity, and integrating theory with practice.
3. The curricula will be implemented according to the notion of learning particular to Helsinki polytechnic. This implies that each student has the possibility to create an individual curriculum based on his/her earlier knowledge and skills. This requires the continuous development of student and staff skills and knowledge and methods of teaching that emphasize active learning.

During the process of refining these strategic aims and planning the continuation of the whole developing project, the Curriculum Quality Indicators (CQI) were used as reference to ensure that the curricula under development would provide the students with the necessary skills and knowledge needed in the world class workplace. Additionally, evaluation of the project's first phase was and the forthcoming phases will be based on the CQIs.

Each curriculum should achieve the stated strategic aims by year 2004. The progress will be estimated annually as a part of the continuous development process in cooperation with the working life, students and researchers of the future at different fields with the help of the Curriculum Quality Indicators. In the first phase of the project, common ground was established to enable the continuous development of each curriculum. The process was carried out through a set of questions formed to ensure that each curricula would meet the requirements set by the World Class Workplace. The next phase will take place in 2000-2001. The work will proceed within the framework created during the first phase and emphasis will be on the strategic aims defined according to the needs of each degree program specified during the first phase.

Elaboration of the curricula was based on a dialogue between the project team and the working groups set for each degree program that used the Curriculum Quality Indicators as a starting point. The project team and all the lecturers who were in charge of the development work took part in these discussions. Project work proceeded through a series of questions and reasoning using the theme areas for the Curriculum Quality Indicators as organizers and the following issues/questions as focal points:

Basic Decisions, Needs, Students, Emphasis on the Future

1. What skills and abilities does the future's working life and area of operation expect of an expert in a field, and why? What does a student expect of his/her education, and why?

2. What kind of curriculum meets these expectations, and why?

3. How can an individual curriculum be implemented, and why?

Outcomes, Flow and Linkages, Application, Students, Value Added Emphasis

4. How does practical training fit in the curriculum, and why?

5. What is the structure of a curriculum like, and why?

6. What kind of expertise does a curriculum require of the staff, and why?

7. What will be the major changes in the curriculum, and why?

The CQI theme areas and world class emphasis will be assessed further and linked more closely to the curriculum development process during the project's next phase.

The project team evaluated the achievements of the first phase and discovered the following:

- Persons involved in the project achieved a comprehensive picture of different degree programs at the polytechnic and found new ways to cooperate. A genuine development work process begun.
- It was possible to create a new, common strategy for developing the curricula that respects differences. A clear framework for developing the curricula was established.
- Persons involved in the project found a common enthusiasm and interest in developing curricula together. An "interactive chaos that creates something new" stimulated new innovations and projects.

In its entirety, the development project strengthened the assumption that curricula can be developed to meet the requirements set by future's working life only by respecting existing differences between the degree programs, strengthening their expertise and working together. Thus, for an expert organization to succeed in the future, it will not only need solid expertise but also well-established cooperation and multidisciplinary networks that cut across traditional boundaries of expertise.

IMPLICATIONS

Several implications for vocational higher vocational education curriculum development may be drawn from this discussion. First, large scale curriculum development projects need to be planned in advance and for the long term. Advance planning combined with the recognition that change will not occur overnight can go a long way toward developing quality curricula. Second, curriculum change across an entire institution requires active support from higher administration and active involvement by faculty and staff at all levels. If this does not occur, it is likely that faculty and staff will not feel they have ownership of the process or the product. Third, the use of quality indicators can aid faculty members in understanding the macro and long-term aspects of the curriculum. This understanding can, likewise, lead faculty members to view the curriculum as more than a series of subjects taught in one program. Ultimately, however, success in institution-wide curriculum reform can help make the whole institution become more than the sum of its parts.

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WHAT IS MISSING FROM ISO 9000 INTERNATIONAL QUALITY STANDARDS TRAINING IN THE UNITED STATES?

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Index: Quality Training, International Standards, Instructional Strategies

Abstract: Carnevale, Gainer and Villet (1991) observed that employers have too often used training approaches that failed to deliver "new knowledge in a context meaningful to the learner." This conclusion was consistent with the results found in a recent study of 406 United States companies that used training to prepare their employees for registration to the ISO 9000 series of international quality assurance standards. The vast majority of companies failed to address employee learning needs, and used few research-based instructional strategies to enhance training transfer from workshop to shop floor. Companies rarely grouped employees by their ability to learn and infrequently used the instructional strategies of analogies, behavioral objectives, imagery, and practice and feedback.

More startling than the lackluster use of these instructional strategies were the results obtained for management commitment. Although workforce training was required by the ISO 9000 standards, and failure to meet this requirement would threaten the quality registration status of companies, there was a general lack of management commitment to training found in this nation-wide survey.

This paper is important because it reveals many shortcomings of training practices by companies engaged in international trade and registered to the ISO 9000 standards. Furthermore, it suggests that grouping employees by their ability to learn may function to enhance the implementation of instructional strategies in such a way as to improve training transfer and reduce nonconformances against the international standards.

INTRODUCTION

Workforce training was required by the ISO 9000 Series of International Quality Assurance Standards. Although important, there were no formal inquiries found that described how companies met the training requirements of these European originated standards. Rather, numerous trade publications were found in a review of the literature that prescribed anecdotal, ad hoc practices that failed to exhibit theoretically sound, research informed instructional methods.

ISO 9000 trade books and magazine articles only reiterated the standard's requirement for training. They did not inform training practices in a way meaningful to workforce training designers and learners. "Training" was defined "in a very broad sense," and included "formal courses and seminars, in-house classroom instruction, in-house practical training, etc."(Kanholm, 1992). All employees were to be "educated" on ISO 9000 through repeated communications in a newsletter, instruction on how to deal with an auditor, and through multiple wall postings of the quality policy (Rabbit and Bergh, 1993). A "formal ISO training syllabus" was to be established, which was to outline training intended to be "not lengthy, just a good overview, supported by transparencies, covering basically what ISO 9000 was" (Johnson, 1993).

THE STUDY

To address this lack of formal inquiry, a random sample mail survey of all private sector organizational sites in the United States registered to the ISO 9000 series of standards from 1987 to 1997 was conducted (Krueger, 1999). From the sample of 736 company sites drawn, a total of 420 companies participated (57%) in this Fall 1997 survey, which surpassed the needed size of 368 company sites to be within $p<.05$ of the population proportion with a 95 percent level of confidence (Isaac and Michael, 1997). Of those 420 participants, 14 reported that no ISO 9000 training had been conducted, which left 406 remaining for analysis in this study.

The survey questionnaire had six-point ordinal scale measures of management commitment to training, employee learning needs, instructional strategies, and training transfer. Management commitment has been seen as a prerequisite to organizational change (Joshi, 1998), and provided favorability or unfavorability cues about training to workers. Time allowances for training served as cues (Tessmer and Richey, 1997), and were measured in this research in terms of workload reductions and production deadline extensions intended to compensate workers for time devoted to training.

Learning was seen as progressive (Gist, 1997), consequently, needs assessment of prerequisite knowledge, skills and abilities was considered an important precursor to new learning and the design of training programs (Goldstein, 1993). For the purposes of this study, the extent to which employees were separated into groups by their ability to learn was measured.

Instructional strategies that used analogies and imagery were cognitive approaches that viewed the learner as actively involved in the learning process. The learner "thinks" and has internal cognitive processes that functioned to mediate the receipt, transformation, storing, retrieval and use of information (Dembo, 1991). These compared with ones that were more behavioral in nature, including the use of behavioral objectives, and practice and feedback. In this latter case, the learner was viewed as passive and learning as a function of reward. Learning occurred when stimulus-response connections were rewarded, and transfer of this learning was facilitated when training conditions approximated the situation where they were used (Goldstein, 1993).

Indicators of near and far transfer, and the number of nonconformance citations by a third party auditor measured the outcomes of training. Near transfer occurred when the consequences of training routine, job-specific "how to do" skills were highly similar to the job situation for which they were intended. To measure this, companies were asked to report the extent to which trainees were able to implement specific ISO 9000 quality procedures after training. Far transfer occurred when the consequences of training non-routine, "how to think" methods were appropriate for the complex and constantly changing nature of the job situation for which they were intended (Clark, 1992). To measure far transfer, companies were asked to report the extent to which trainees were able to explain how the new ISO 9000 quality system worked for the overall organization.

RESULTS

Management commitment to ISO 9000 workforce training was measured using the two indicators of production deadlines and employee workloads. For comparison purposes, only the bipolar extremes of the scale were reported here. Specifically, 56.8% of company sites reported the production deadlines were never extended for employees in order to compensate for the time devoted to ISO 9000 training. This compared with only 2% of companies that always made these training accommodations. This tendency was similar for the indicator that measured the extent to which workloads of employees were reduced in order to compensate for training time. For this measure of management commitment to training, 41.6% of company sites reported never to have reduced workloads, while only 3.2% always did.

Company sites were asked to report to what extent employees were separated into groups by their ability to learn. The vast majority of sites (82.3%) reported that they never separated their employees in terms of this measure of training needs assessment.

To further assess the effects of ability grouping, Spearman rho rank-order correlation statistics were calculated for those companies that always or frequently separated their employees by their ability to learn in comparison to those that sometimes or never did. The reduction in nonconformances associated with the training techniques of behavioral objectives (-.723), imagery (-.512), analogies (-.505), and practice and feedback (-.481) were not only statistically significant at the $p<.05$ level, but far exceeded the slight correlations obtained by those companies that reported to have never or sometimes separated employees by ability when using these instructional strategies (i.e., correlations ranging from -.109 to -.147).

Behavioral objectives as an approach were measured by the extent to which specific objectives were used to guide training; i.e., precise written statements of what the employee will be able to do as a result of training. Companies tended to cluster towards the never or sometimes end of the continuum 64.4% of the time, with only 5.7% of companies reported to have always used objectives to guide ISO 9000 training. Slight but statistically significant Spearman rho correlations were obtained, positively with near transfer (.177, $p<.01$) and far transfer (.235, $p<.01$), and negatively with the number of nonconformances (-.128, $p<.01$).

Imagery was measured in this study by the extent to which employees were given instructions to form a mental picture of the quality system, imagining how it works. Once again companies tended to cluster towards the never to sometimes end of the continuum 65.5% of the time, with only 6.4% reporting to have always used this cognitive instructional strategy. The slight but significant near (.143, $p<.01$) and far (.213, $p<.01$) correlations were also evident, except when employees were grouped by their ability to learn. In the case where companies reported that they always or frequently used ability grouping, near (.480, $p<.05$) and far (.655, $p<.01$) transfer increased markedly in their association with imagery.

Analogies, which compared the quality system to the common, every day life of employees, appeared more frequently in company training. Their use tended to cluster towards the middle of the scale, with 86.5% reporting in the sometimes to frequently range. Analogies obtained slight, significant correlations with near (.121, $p<.01$) and far (.228, $p<.01$) transfer, but a more pronounced correlation with near transfer (.459, $p<.05$) when ability grouping was frequent to always used.

Similar to analogies, practice and feedback occurred in training more often. They were measured by the extent to which employees practiced the new procedures during training and received feedback from trainers. Companies tended to cluster towards the middle of the distribution for this measure. They were significantly correlated with near (.278, $p<.01$) and far (.245, $p<.01$) transfer, but once again benefited when companies reported ability grouping. Separating employees by their ability to learn frequently to always resulted in an increased association between near (.638, $p<.01$) and far (.458, $p<.05$) transfer and the practice and feedback instructional strategy.

DISCUSSION

Grouping employees by their ability to learn appeared to be an important result to emerge from this study. Companies that reported this practice frequently to always obtained stronger, positive correlations between their instructional strategies and near and far transfer, than organizations that never or sometimes practiced this method. These results appeared consistent with the substantially larger negative correlations obtained between instructional strategies and the number of nonconformances cited against companies; i.e., increased ability grouping, when implementing instructional strategies, was associated with decreased nonconformance citations by third-party auditors.

Few companies used the instructional strategy of ability grouping and represent an area for concern. Unskilled and semi-skilled entry-level workers have not reached the levels of competency evidenced by skilled workers and professionals. Prerequisite knowledge and skills have served as precursors to advanced learning. Is it reasonable to expect a first grader placed with eighth graders to perform as well?

The commitment of management to the support of ISO 9000 workforce training, as measured by the production deadline and workload reduction indicators, was another serious concern. Comments appeared on several of the surveys that addressed this problem from the perspectives of the questionnaire respondents. ISO 9000 workforce training was "not initially looked at as favorable by management" and "still does not support it fully," being "viewed as a unnecessary investment" that "was dictated by headquarters." Some workers consequently saw ISO 9000 "as another flavor of the month activity."

Of course caution should be exercised when interpreting these results. Some limitations may arise from the nature of correlational research, standardized surveys, cross-sectional designs, ordinal data, and the use of nonparametric statistics.

Correlation was not causation (McMillan, 1996). The statistically significant correlations reported in this study represented necessary but not sufficient conditions to establish cause-and-effect relationships between instructional strategies and training outcomes.

Standardized survey questionnaire items were limited to the extent that they were approximate indicators of training behavior, potentially simplifying complex phenomena for measurement purposes. Measurement was limited by the small number of measures that were standardized, largely closed-ended and quantitative (Babbie, 1998).

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WEST VIRGINIA
INSTRUCTIONAL TECHNOLOGY PROGRAM DESIGN FOR ECONOMIC DEVELOPMENT

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Index: Skill Training, Distance Learning, Economic Development, Information Technology

Abstract: The expansion of technology throughout the entire technical education spectrum is linked to the successful implementation, integration and support of the new educational paradigm. Education must build on a strong technical infrastructure. Common strategies in physical infrastructure connectivity, philosophies, training and support will build the firm foundation upon which all other advances can be successfully sustained. West Virginia technical education must move in a sound collaborative mode that improves workforce preparedness. No matter where the company is located, workforce development is a vital component of the overall strategic economic development plan and must occur concurrently with development efforts, distance learning may be a key to training delivery. Industry consistently indicates that certification is much more important than college degrees. College and universities should look to inclusion of these certification skills into their degree programs. The formation of this delivery model will involve a cooperative effort of the State Colleges, Universities, Community Colleges and Technical Education Centers.

PHILOSOPHY – INFRASTRUCRURE - COLLABORATION

The expansion of technology throughout the entire technical education spectrum is linked to the successful implementation, integration and support of the new educational paradigm. Education must build on a strong technical infrastructure. Common strategies in physical infrastructure connectivity, philosophies, training and support will build the firm foundation upon which all other advances can be successfully sustained. West Virginia technical education must move in a sound collaborative mode that will improve workforce preparedness.

EMPLOYMENT/TRAINING PARADOX

Training for workforce development continues to be faced with the chicken and egg paradox. Do we train for existing and expanding industries or do we train to attract new industries. Historically the skills needed for manufacturing construction and service industries have been more stable than those emerging in the Information Age. Bricklaying, for example, has not changed basic skills significantly over the last 50 years. Our Gifu Japan Office has indicated to us that the life of a computer game is now estimated at one month by Japanese software developers. Obsolescence of technology is growing at an ever-increasing rate due to advanced development and user expectations. Computers, for example, have generally been placed on a three-year replacement cycle. A three-year old computer is probably still usable and is physically and electronically sound but will not run the software needed to be competitive for the business enterprise environment.

"JUST IN TIME TRAINING"

As West Virginia's employers adjust to the challenges of technological change and the need to develop a globally competitive workforce, the use of technology as an instrument to enhance the delivery of technical education's workforce development programs, is becoming increasingly necessary. The demand for a "just-in-time" workforce development delivery system in a competitive client-driven environment challenges education to become more creative in utilizing technology to satisfy these needs. Traditionally training institutions have not been proactive in providing cutting edge training. Perhaps this type of training should be conducted by industry?

GOVERNMENT – EDUCATION – INDUSTRY COLLABORATION

Government, industry, and business in West Virginia are moving rapidly toward the Information Age. The State of West Virginia made significant strides toward delivery of services and government functions through information technology as evidenced by the Information Technology Strategic Plans located at www.state.wv.us. Federal government installations in West Virginia (such as the Federal Bureau of Investigation Fingerprint Lab, Internal Revenue Services Area Processing Centers, and Public Debt Office) also contribute to the WV information technology base. Information technology industries are being promoted and are growing as a result of the National Technology Transfer Center (www.nttc.edu), the West Virginia High Technology Consortium Foundation (www.wvhtf.org), the West Virginia Development Office (www.wvdo.org), and the Governor's Office of Technology Japan Office (www.wv-jpnet/got/default.htm). These developments are part of the overall plan to groom the West Virginia economy through information technology. The High Tech Consortium is offering a Virtual Company service, which can link companies through the internet in a corporate relationship any where in the world. No matter where the company is located, workforce development is a vital component of the overall strategic economic development plan and must occur concurrently with development efforts. Industry consistently indicates that certification is much more important than college degrees. Cisco, Novell, and Microsoft certifications are valued by industry. College and universities should look to inclusion of these certification skills into their degree programs.

UTILIZING TECHNOLOGY FOR SELF DIRECTED LEARNING

The present state of technology permits us to reestablish the self-directed learning method as a part of an instructional alternative offered by technical education. For the student who learns more effectively in this manner, multimedia, technology-assisted web-based courses could provide the opportunity to recapture the love of self-directed learning. Although research might not be available which supports technology as being the missing link in learning methodologies, the US National Science Foundation has targeted many funds, which will be used to investigate this new opportunity. Most certainly, with technology, WV can begin to provide again the possibility of getting the credentials or the skills necessary for productive, fulfilling, and responsible work. Technology can and should be applied to make the promise of an education a reality for those who need this new chance to participate fully in society. Development education and workforce preparedness are logical targets of the technology. Technology focused in this manner, cannot be challenged as effectively increasing access, meeting student needs in an environment which is insensitive to the barriers of semester beginnings and semester endings, and which can identify, without prejudice, the strengths and shortcomings of the individual learner.

Technology can easily accommodate the individual who learns quickly. This is a commonly accepted reason for adopting technology. Less commonly recognized is that many students, who learn more slowly, can benefit from the technology-assisted approach. A web-based presentation can be reviewed as many times as necessary for understanding.

QUALITY CONTENT

We must not loose site of our objective when providing work force training. It is easy to get lost in the blur of technology and forget that technology is the media not the message. History has repeated itself with digital technology much like print, audio, and video technologies. Early on too much emphasis is given to the technology rather than the content and application. Fortunately, digital technology is emerging from the beginning stages to a stable environment as evidenced by the quality of programming available from educational institutions and especially industries like Microsoft, Cisco, and other major IT vendors.

VIRTUAL CURRICULA

As statewide efforts to deliver workforce development programs involving several different public institutions proceed, asynchronous learning which utilizes the Internet, the ATM infrastructure, multimedia, and other forms of technology can provide delivery in a more cost effective, accessible, and efficient manner. The development of curricula utilizing a variety of technology assisted delivery models will become the norm. In addition, significant professional development efforts must be undertaken to encourage interested faculty in becoming proficient in creating technology assisted courses, which employ a "virtual curriculum" model that will deliver course content in "chunks". This type of delivery system will be absolutely necessary to meet the time constraints of workers and employers alike. The use of the Instructional Performance System Inc (IPSI) software suite, which is a structured approach to curriculum development utilizing the "virtual curriculum" and "chunking of content" concepts, is presently being utilized by West Virginia's public higher education institutions delivering community and technical college education. The use of IPSI needs to become more widespread in order for faculty to develop curricula that provide for the workforce readiness demanded by employers. This type of development and delivery by selected faculty should create an environment more conducive for the transfer of knowledge to other faculty. This will encourage more utilization of this method in the delivery of the regular curriculum, and will thus result in systemic changes as to how workforce programs are delivered.

ELECTRONIC INFRASTRUCTURE

West Virginia has made great strides in building the infrastructure to deliver digital based training throughout the State by development of the West Virginia State Unified Network (WVSUN [www.state.wv.us/got/wvsunplan]) for carriage of signal for all state agencies, including K-12 and higher education. WVSUN by utilizing Asynchronous Transfer Mode (ATM) technology will be able to provide voice, video, and data needed to transmit distance learning effortlessly. West Virginia will continue to capitalize on other states and countries developments. Over 600 college courses are now available through the Southern Regional Education Board (www.sreb.org). Over 400 Computer Based Training courses (CBT) were made available through WVSUN (www.wvnet.edu). In addition, West Virginia University (www.wvu.edu) Marshall University (www.marshall.edu) along with other colleges, community colleges, and technical schools continue to offer technology training through distance learning venues.

CONCENTRATION

Over the next few years, four different programmatic areas will be addressed for application of asynchronous learning and the virtual curriculum model for the delivery of workforce development programs. These areas are Manufacturing Supervision, Manufacturing Technology, Emergency Medical Services and select Governor's Guaranteed Workforce Program training modules. The goal is to develop curricula in Information Technology, Identification Technology, Virtual Reality Technology, Manufacturing Supervision, Manufacturing Technology and Emergency Medical Services in the IPSI format and making them available to all West Virginia educational institutions involved in the delivery of these programs. Selected courses in each program will be put into a technology assisted delivery mode. In addition, those Governor's Guaranteed Workforce Program training modules that are in the most demand and lend themselves to technology-assisted delivery will be put in that mode and made available to members of the West Virginia Training Network.

COOPERATIVE EFFORTS

The formation of this delivery model will involve a cooperative effort of the State Colleges, Universities, Community Colleges and Technical Education Centers. In addition the Human Resource Investment Council, the Work Force Investment Boards, the West Virginia Development Office and various business partners including the West Virginia Manufacturers Association and the West Virginia Roundtable.

A PERCEPTION OF THE SOFTWARE PROCESS MODEL

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Index: Perception; software; product; process; students; quality attributes

Abstract: A student's perception of a software development process model appears to be a series of milestones when documentation is produced to satisfy academic requirements. Certain academic and industrial practices may influence students to place more emphasis on the software product than the process model.

The proposal presented is to establish a more structured approach to project supervision to ensure a student performs quality planning, which includes the identification of appropriate software product quality attributes. Such an approach may ensure that sufficient attention is given to the software development process model to ensure that desired software product quality attributes are achieved.

INTRODUCTION

A student, who seeks vocational training, rather than undergraduate studies, normally has an aptitude for doing practical tasks. A major piece of work that computing students undertake is an individual software development project. The development of good quality software requires the adoption of a disciplined approach to all the tasks involved. This approach is in the form of a chosen methodology based upon a particular software development process model.

DEVELOPMENT PROCESS MODELS AND METHODOLOGIES

Sommerville (1995) has identified the following generic software development process models:

- The waterfall model - separate and distinct phases of specification and development
- Evolutionary development - specification and development are interleaved
- Formal transformation - a mathematical system model which is formally transformed to an implementation
- Reuse-based development - a system is assembled from existing components

Common methodologies include:

- Structured Systems Analysis & Design (SSADM) which is based on the waterfall model (Goodland and Slater, 1995).
- Mechanism for component reuse in Languages and Environments are: Borland Delphi; Microsoft Visual Basic; Microsoft Windows: CORBA and Java (Bennett et al., 1999).
- Rapid Applications Development (RAD) is a rapid linear sequential model based on component construction (Pressman, 1997).

- Unified Software Development Process for: visualizing, specifying, constructing and documenting object-oriented systems (Booch et al.,1998).

These methodologies/methods/software provide help in: analyzing a situation; defining the problem; designing the solution and in the subsequent implementation.

EXPERIENCE OF PROJECT SUPERVISION

A recurring experience in the supervision of software development projects in vocational education is the apparent lack of importance attached, by the students, to the use of a software development process model. Student projects should address a significant business or technical problem and it must be feasible to complete the project within the allocated time. Many possible realistic projects require some application domain experience which students lack. Thus many student projects are more implementation-oriented dealing with more general applications which are more easily understood. The major focus for the student therefore is the implementation issues. Students having the necessary practical skills can develop a tangible software product without compliance to any software development process model. Whereas adhering to a software development process model, which necessitates the use of abstractions, such as architectural design and process design, to ensure the achievement of certain software product quality attributes is much less tangible.

DEFINING SOFTWARE PRODUCT QUALITY ATTRIBUTES

Definitions of some software product quality attributes are given below:

Maintainability - it should be possible for the software to evolve to meet changing requirements

- Dependability - the software should not cause physical or economic damage in the event of failure
- Efficiency - the software should not make wasteful use of system resources
- Usability - the software should have an appropriate user interface and documentation

STUDENT PERCEPTION OF A PROCESS MODEL

A typical student's perception of a software development process model appears to be a series of milestones at which documentation is produced and presentations made to satisfy academic requirements. The documentation can take the form of:

- Initial Report - The student has to: demonstrate an understanding of the problem; to have completed sufficient preparatory work; to have a plan of work.
- Interim Report - This includes the analysis, requirements, initial design, prototypes etc.,
- Final Report - A documented system in terms of requirements, analysis, design, implementation, testing and systems manual and user guide.

The contents of the first two reports are frequently the only tangible visualization of the software product that can be seen and the correlation between these and the actual development work is really unknown.

The perception held by students may be attributed to a number of academic factors and industrial practices, which are listed below:

- academic assessment is based on the quality of the documentation;
- academic and industrial supervisors attach great significant to a fully functional product;
- graduates attached great importance to meeting deadlines;
- Small to Medium Enterprises (SMEs) place great significant in commissioning new software systems on time.

How each of these factors might lead to a lack of importance being attached to software development process models is given below:

academic assessment is based on the quality of the documentation

Whilst this statement is true, a common practice is the production of good quality documentation solely for the purposes of assessment **and not** as a design solution or a record of actual work done. In other words the documentation is not a natural byproduct of following a software development process model.

academic and industrial supervisors attach great significant to a fully functional product

It is a natural tendency to try and fulfil a software specification and satisfy the 'client' with the required working system. The drawback here is that 'slippage' in following a software process model may result in inherent defects in a delivered system. Practitioners may consider that additional functionality is advantageous to a 'client' and any defects can be corrected when a problem arises. Thus the software will be unavailable whilst the defects are removed. However with safety-critical software systems, such as air traffic control, the achievement of certain quality attributes such as reliability and response time is very important. However the achievement of some quality attributes may conflict with the achievement of other quality attributes e.g. the more functionality added to software the more difficult it may be to achieve or maintain a high level of reliability. A table provided by Vliet (1993) illustrates the trade-offs between quality factors.

graduates attached great importance to meeting deadlines

Informal feedback from graduates is that, the delivery of new systems is **the** priority and little emphasis is placed on documentation, if even produced. The rationale for this practice is that the life expectancy for systems is relatively short.

Small to Medium Enterprises (SMEs) place great significant in commissioning new software systems on time

It is a natural desire for all enterprises to have new software systems delivered on time. In the context of Hong Kong it has had a greater significance for SMEs who have always operated in a very competitive environment with very short time horizons. However if SMEs are to achieve more maturity in the process model they follow to develop software then they need to better manage their requirements and quality assurance. The requirements include setting the desired quality attributes at the commencement of each project.

The perception held by students of process models can have major consequences for industry. Graduates will develop software systems, which do not have the necessary quality attributes. The absence of the necessary quality attributes means a system does not fulfill the requirements. This may result in an organization committing additional time and resources to overcome the shortcomings of the delivered system. Systems might need to undergo considerable reworking to achieve a state in which it is acceptable for use. In extreme cases the software may be scrapped altogether.

TEACHING AND LEARNING DOMAIN

Within the teaching and learning domain there is an established strategy in the conduct of software development project supervision. The learning objectives normally state that a student should apply their knowledge and skills to implement a solution of a reasonably complex problem set. The established strategy has strengths in terms of: monitoring progress, by regular meetings with the project supervisor : quality assurance, with students timetabled for project laboratory classes each week when teaching staff are available for general advice assistance. Quality assurance in this context is really to ensure that students are taking a disciplined approach to their work and utilizing a methodology in a proper manner. This is similar to a formal definition of quality assurance: Establish organizational procedures and standards for quality (Sommerville, 1995).

PROPOSAL

The proposed approach to address this situation is to establish a much more structured approach to project supervision to ensure a student performs quality planning and another person rather than the project supervisor perform the activity of quality control. (Any quality management activities should be separate from project management to ensure independence. Quality management in this context is the overall management of the quality of the software process and product.)

Formal definitions of quality planning and quality control as provided by Sommerville (1995) are given below:

- Quality planning

Select applicable procedures and standards for a particular project and modify these as required;

- Quality control

Ensure that procedures and standards are followed by the software development team.

QUALITY CONTROL

Teaching staff in the timetabled project laboratory classes each week can perform the activity of quality control. This is a clearly defined task of ensuring students follow a methodology using the appropriate techniques available. However the definition of quality planning given above needs more attention to actually determine what tasks need to be performed.

QUALITY PLANNING

At first glance one might consider the only task is to select an appropriate methodology suitable for the process you wish to follow in developing the software. An additional task that should be performed is that of selecting the desired software product quality attributes for that **particular** project. To define these quality attributes alone is insufficient. To help determine if the software product has these quality attributes requires some sort of measure to be able to be taken.

MEASURING SOFTWARE PRODUCT QUALITY ATTRIBUES

This task has been considered by Hughes & Cotterell (1999) who state 'Trying to find measures for a particular quality helps to clarify ideas about what that quality really is……In some cases we can measure the quality directly while in other cases the thing being measured is not the quality itself but an indicator of the degree to which the quality is present'. A student project proposal should include identified product quality attributes that must be present for their software to be considered acceptable.

EXAMPLES OF MEASURES

One example of a product quality attribute could be 'usability' and the first task is defining what this attribute means in the context of this project. This definition should be the result of negotiation between the student and the project supervisor. This definition could be …users should be able use the software after two hours training…or …the average response time is 30 seconds. This type of attribute can be quantified and measures taken to determine if the desired quality attribute has been achieved. Another possible product quality attribute could be 'maintainability', which includes incorporating new requirements. This is more difficult to quantify and measure. As mentioned by Hughes & Cotterell, above, sometimes it is not the quality measure but an indicator that it is present. How a project supervisor deals with 'maintability' is again subject to negotiation with the student. One could say you do not know how easy or difficult it is maintain software until a sufficient number of changes have been made over a period of time. Obviously this would be of no use in the context of a student project. However the project supervisor could take a number of innovative approaches such as: applying a design quality metric such as the *design structure quality index **(DSQI)***, Pressman (1997) provides a example of this metric; giving a new requirement after the software development has been completed. The ***DSQI*** measure can help determine whether further design work should be undertaken. A good measure would be indicative of a design with good characteristics that would enable relatively straightforward and efficient changes to be made to the software. Likewise the ease or otherwise of incorporating a new requirement after completion of the software will indicate the degree of maintability present in the software.

CONCLUSION

Many student projects are more implementation-oriented dealing with more general applications which are relatively easily understood when compared with more realistic projects. The major focus for students therefore is the implementation issues. A project student can create a tangible software product without any real compliance to any software development process model. However to have a chance of achieving the required product quality attributes, which more realistic projects would demand, necessitates sufficient attention being given to the software development process model. The required software product quality attributes identified at the commencement of the project must be achieved to be indicative that an acceptable software product has been developed.

Such an approach would ensure that sufficient attention is given to the software development process model to ensure that the desired quality attributes are achieved.

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DESIGN OF INTERNET-RELATED COURSES FOR IT PROFESSIONALS

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Key words: Internet, Course design, Programming, e-commerce, Multi-media technology, Security, Technical support

Abstract : With the emergence of E-commerce, the Internet-related activities have been escalated for the past two years in Hong Kong. As a result of this, there is an increasing demand on the IT professionals who are able to design, develop, and support the Web businesses. However, there are a few professional courses available in these areas to re-train the existing IT professionals. Although, e-commerce or related programmes are being offered by universities in Hong Kong, it needs to take a couple of years before the graduates are released to the market. There is an immediate need to design and offer related courses to meet the community need. This paper presents course design philosophy on the Internet-related certificate courses that are being offered jointly by the Division of Computer Studies and the School of Professional and Continuing Education, City University of Hong Kong. The paper covers the practicality on the course contents in order to meet the diversified skill sets. It addresses the balance between technical substances and commercial skills. These include the knowledge, skills and proficiency on e-commerce, programming, database design, IT security, legal issues, technical support, e-entertainment, web design involving multi-media technology etc. The strengths and weakness of these courses, students' behaviours, and the future direction are also discussed in this paper.

1 INTRODUCTION

The emerging e-business in recent years has opened up many opportunities for new development and training in IT applications. This emergence will translate into a new demand for the design of user-friendly, content based and sophisticated software over the Internet. On the other hand, the convergence of computing and communication technologies is beginning to impact on organizational processes in terms of product development, resource acquisition, order fulfillment, customer service and ways of doing business. Apart from the business to business and customer to business models, the product promotion, e-entertainment, security, multi-media based interface, and information search over the Internet are of significance to a successful business.

With the move to a knowledge-based society, there is a strong demand for IT professionals and business analysts to make use of the Internet platform for business activities. There is a strong demand of professional courses to train IT professionals to design, support and administer the web sites; business analysts to make use of the web site to promote products and to do business; security professionals to develop a more secure transaction platform making use of firewall; legal practitioners to enforce cyber law to protect both parties; and for Web designer to create a nice interface with creativity. In view of these requirements, this paper addresses the design issues related to the Internet based vocational courses. The objectives of this paper are to:

- examine how successful the courses have been in attracting and retaining learners and assess the methods used in the process;

- assess the success of flexible design methodologies in terms of the method of delivery and relevance of the training contents; and
- compare and contrast the performance of the various courses and identify factors influencing their performance.

The paper is organized as follows. Section 2 presents a brief description on course design related to the Internet. Sections 3 and 4 present the admission requirements and course structure. The learning environment, motive for attending and barriers are also discussed. Section 5 lists the operational consideration and objectives achievement. The course assurance and monitoring are covered in section 6. The advantages and limitations are discussed in section 7.

2 COURSE DESIGN

Shown in Figure 1 is the block diagram describing the Internet activities. In this diagram, a browser can access the information stored in a server or through its database server. The user might want to download software or to visualize the virtual reality effect. This involves the multi-media technology. A user might want to buy a product, he needs to input his Visa card number. This involves the customer to business model and security. A company buyer might place an order to buy products. This involves the business to business model. A business analyst might look at the opportunity of using web to promote products in order to have global presence and market penetration. A customer engineer might need to support the hardware, router, server etc. to ensure the system is running smoothly. A database administrator might support the web database to ensure the relevance of contents requested by the user.

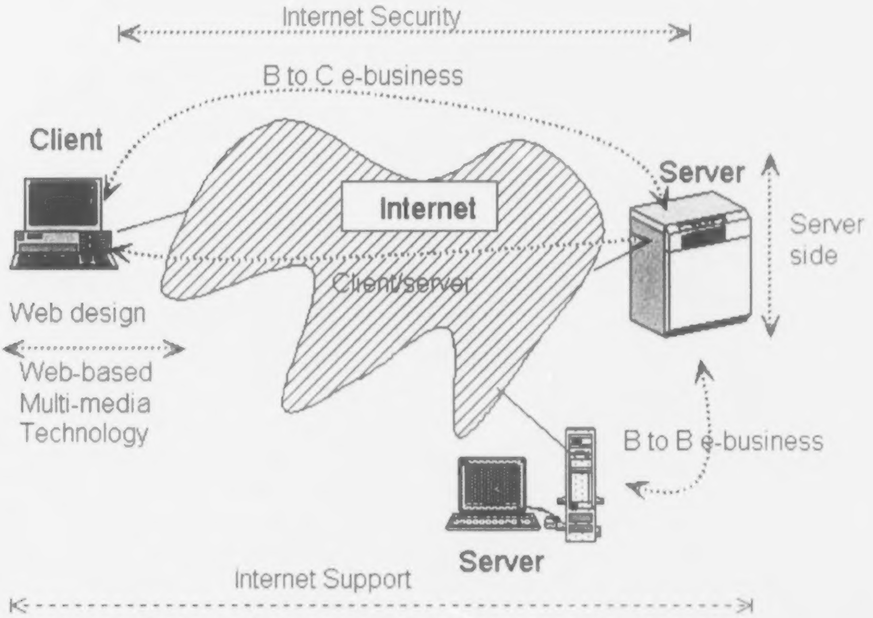

Figure 1 Training demands over the Internet

In order to meet the need, there are a number of potential courses that are specifically designed on the understanding the Internet as shown in Table 1.

Table 1 Course aims and training platform

Course	*Aims*	*Training platform*
Developing e-business	How to make use of the Internet to sell/buy products	Understanding the necessary technical skills, e-marketing, payment, security, legal aspects
Web Programming	How to develop client and server side to process data	Java, Database, JavaScript, HTML and Extended HTML
Web based Multi-media technology	To develop a sophisticated interface with graphics, animation etc.	Flash, director, virtual reality markup language, computer music, video/audio editing
Web design	To provide a good user interface and screen layout	Design foundation, sketch concept, 2D/3D visualization
Internet Security	To provide a secure trading platform and set up policy	Cryptograph, secure socket layer, virus free environment, firewall
Server side using Linux	To provide in-depth knowledge on the installation, commission, support of server using Linux	PHP, CGI, IP networking, X Windows, Linux
Internet Support	To provide support on Internet/Extranet	IP network, router, switch, LAN and WAN
Digital entertainment	To use Internet to provide game	Direct X, Script writing, Computer graphics, animation

The majority of courses are being offered. Some are even offered for longer two years. To describe the details of aims and objectives, two courses such as Web design and Server side using Linux are specifically shown below for reference.

2.1 Aims and objectives on Web Design

This course is designed to equip IT practitioners who has little knowledge on design but are involved in dealing with the use of multi-media products to develop Web applications. The working environment is the Internet based client-server system. This course aims to provide fundamental design concept, knowledge and skills to those who may wish to keep up with developments either for career advancement or the acceptance of new responsibilities. The course covers the materials to participants in developing more innovative but practical Web interfaces with the following knowledge and skills:

- Posses a sound broad-based foundation on visualisation;
- Posses the fundamental skills in 2D and 3D studies;
- Be capable to produce a 2D/3D layout/sketch using computer package; and

- Acquire an understanding in quick sketch, figure drawing, design principle, typography, colour principle, form and texture, and be capable to apply the techniques on the Web page.

2.2 Aims and objectives of Server Side using Linux

This course is about the server side, as Linux has become the powerful industrial standard operating system on computers ranging from PC to supercomputer. Linux is a UNIX like operating system, its kernel is supported in part by utilities provided by the Free Software Foundation. With the emergence of Internet and popularity of Linux as the WEB server, there is a strong demand for training IT professionals in the installation, system administration, networking, configuring and programming under Linux environment in the Internet. In view of this situation, this course is designed to provide an effective way for computer personnel with the breadth and depth of the knowledge and skills required supporting WEB server.

A reliable Web server relies on a number of factors including system performance evaluation, appropriate networking tool, Internetworking skills and ample support of CGI commands and PHP. This course therefore emphasizes the application of useful tools such as developing guest book, simple search engine, counter, dynamic HTML by making use of extensive freeware in the Internet. This will enable the administrator to provide a holistic service but secure server to the end user. In addition, this course covers the basic Unix commands and project for a new starter to learn from beginning and demonstrated their achievement through the project with the following knowledge and skills.

- Posses a sound and broad-based knowledge of Unix commands and internals;
- Understand the necessary system administration and installation;
- Be able to use shell programming to monitor the system performance;
- Be able to develop CGI programmes and Perl Programmes to interact with browser and database;
- Possess the abilities to develop X windows application;
- Posses the networking skills to configure the server as an Internet node; and
- Be able to develop useful Internet tools to help end users such as guest book, simple search engine, counter and dynamic HTML.

3 ADMISSION REQUIREMENTS

All the certificate courses are primarily targetted for those who were trained on conventional IT skills and for those who like to develop a career in web design, support, security, e-commerce and digital entertainment. These courses are also for those IT professionals who would like to build up their foundations on Internet related development. The admission requirements are:

1. should hold a Diploma, Higher Diploma or Degree in Design, Computer Science, Information Technology, Information System, Mathematics, Engineering, Business or equivalent;
2. are engaged in Web/Internet related jobs.

4 COURSE STRUCTURE AND STUDENTS' CONCERN

The aims of the course would have been achieved when all the objectives are met in the course. The objectives are reached through a curriculum and a variety of training, teaching methods and approaches used in the delivery of this course. To satisfy the objectives, the Internet related course provides:

- A programme of lectures to allow assimilation of the key components in the Internet computing environment.
- A range of modules to introduce the courses. For example, for Web design course, it covers visualisation techniques, 2D studies, 3D studies, and computer implementation to develop a skilled approach to problem solving and creative thinking through laboratory practices, tutorials and self-exploration.
- A staff supervised project in the last three months to apply the knowledge gained from the taught modules. The project must be a deliverable commercial product or business plan on the Web.

4.1 Learning environment

Many students don't like the conventional approach which packs all the materials together with breath not in depth. They liked this modular approach is that this approach allows 'the students to work at their own pace'. Students felt that this was a particular problem with University courses, which

- are generally time-constrained with too much to pick up in a short period of time; and
- require students to attend rigidly and it is very difficult to keep up if one misses lessons.

The modular nature of these courses allows students to take light exams, as many mature students had been outside an educational environment for a long time. Some expressed the view that asking the lecturer on the flexible training course was less embarrassing. Overall, it was evident that by splitting the areas into a number of courses seems to be a good way for them to gain experience of a learning environment. An advantage of a flexible course is that it should be easier to change course if it does not suit the individual.

Survey was specifically asked whether the approach might have a negative affect on motivation levels. The consensus view was that if an individual was prepared to attend a course then they had the required level of motivation. Of those that had dropped out of the course gave the reason that it was difficult to retain interest without a structure and also due to the workload in the daytime. However, some students felt that the modular nature of courses actually helped motivation. It is suggested that a more formal induction process may well counter some of the negative aspects that are inherent in a flexible learning environment.

4.2 Motive for attending

Whilst a high proportion of students did not know exactly what course they wanted to do they were for the most part clear that they wanted and/or needed to improve their Internet skills. A surveyed identified the reason for undertaking this course as being to get a job, and those who wished to improve their Internet skills related to employability.

Some learnt the Internet skills with the intention of going on to carry their computer job so that he/she would be able to become self-employed or work in a new job. Some took this as part of their continuing education. Only small minorities of students were attending simply to gain access to the Internet.

4.3 Barriers

All course materials are technical based and therefore it would be relatively difficult for IT layman with little knowledge on the use of IT to successfully complete the course. Indeed, except the e-business course that demands business, legal, security and limited technical skills, all the students felt that there is no specific problem on their learning. Another barrier that the students have to solve is to balance their workload and learning. Most of them are very busy with their daytime jobs and have little time to carry out their projects.

5 COURSE FLOW AND OBJECTIVES ACHIEVEMENT

All the courses are described key development components. Table 2 illustrates how these modules relate to the key development themes for the course of Web design. It also indicates where the stated objectives of the course are to be met. As stated in Section two of this paper, each course has its unique objectives achievement.

Table 2 Objective achievement for Web design course

Module of Study	*Drawing skills*	*Design skills*	*Computer skills*	*Management*
Visualisation Technique	?	?		
2D studies	?	?		
3D studies	?	?		
Technical implementation using PhotoShop		?	?	
Project	?	?	?	?

Here, this Web design course covers the objectives of drawing skills, design skills, computer skills and management as well.

Similarly, Table 3 illustrates how these modules relate to the course of Computer Game over the Web. Here, the objectives are different from Web design, as it covers technical, administrative, programming and management aspects in computer game.

Table 3 Objective achievement for computer game over the Web

Module of Study	*Technical skills*	*Administration*	*Programming skills*	*Management*
Game theory and Ethics				?
Game Project Management		?		?
Computer Graphics Theory	?			
Technical Overview of Game Development using Direct X	?		?	?
Computer Music and Sound Effect	?		?	
Script Writing	?	?		?
Game Development Engine	?		?	
Application of 3D Engine	?		?	?
Project	?	?	?	?

5.1 Mini-Project

A mini-project is mandatory in each course in order to provide students experience in managing, planning and controlling a system development project through the implementation of an application. It also provides an opportunity for integrating and practising the skills covered in the taught modules. Apart from technical implementation, this module covers:

- Design management
- Application of some of the skills, tools and techniques developed during the course to develop an action plan on the Web.
- Identification and definition of system development framework

5.2 Assessment

In order to obtain an award, each student is required to pass written examinations and submit a project of his own choice. The project must be related to the Internet such as computer animation, security action plan, business plan, e-shopping etc. The project must be completed three months after the completion of last module in this programme. To be eligible for the award of the certificate, students must:

1. achieve 70% attendance,
2. pass one written examinations (40%) set by the module lecturers, and
3. achieve a PASS grade (40%) for the project.

5.3 Teaching Schedule

A sample of teaching schedule which consists of four modules, one examination and one project related to Web design is shown in Table 4. Examination is in the format of multiple choice to reduce the students' loading. This arrangement makes them adaptable to the learning environment with less pressure arising from the examination.

Table 4 Module flow for Web design course

Sequence	*Module*
1	Visualisation techniques
2	2D studies
3	3D studies
4	Technical implementation using PhotoShop
5	Exam
6	Project

5.4 Summary of Teaching Mode

Each course is supported by what teaching pattern together with the facilities. Table 5 shows the facilities for the Web based multi-media courses. This enables the students to easily understand the flow of modules and their linkage amongst them.

Table 5 *Teaching mode for Web based on multi-media course*

Modules	*Lecture*	*Laboratory*	*Project*	*Training Platform*
Multimedia Project Management	6	6		MS Project
Multimedia Design, production and Management	9	9		Macromedia Director and Authorware
Internet Management	12	15		NotePad, Netscape, FrontPage 98, MS SQL
Human Computer Interaction	9	12		CorelDraw, Acrobat Reader
Internet Programming for Multimedia Application	12	12		Java, Java Script
Computer Music	9	9		16 bit sound card and MIDI interface
2D/3D Rendering and Animation	9	12		MacroMedia Flash
Virtual Reality	9	12		VRML
Project			24	
Sub-Total	75	77	24	Total=179

6 COURSE MANAGEMENT AND MONITORING

A course committee was established to conduct the course according to the regulations. In monitoring the operation and performance of the course the committee was responsible for such matters as admission, curriculum, teaching methods, assessments, evaluation and recruitment of course instructors.

6.1 Course Evaluation

Classes were conducted in three 2-hour sessions a week. As a result, the evaluation involved a qualitative and quantitative approach and focused on four areas which form the basis of the following:

- Effectiveness – to test whether the method adopted by the lecturer is appropriate
- Innovation – the teaching material can help create new ideas in their work
- Impact – how to make use of taught knowledge in their work
- Operational performance – the laboratory exercises are practice based.

Project progress was reviewed against the outcomes proposed in the original application and the project's success was also considered in the context of the aims of the programme.

6.2 Project

Students are paired up to do a project on their own choice. Most of the projects are related to their problems in their jobs. These might cover the security in a small or medium business environment, a multimedia based learning web site, a trading system, a web banner for promotion etc. Generally, there are relatively few on-going technical problems with hardware and these can for the most part be solved relatively simply with support from the supervisor. There were, however, delays in setting up the project because of the IT-based nature of the project.

6.3 Exam process

For the conventional exam paper involving questions, it is well known that it takes a long time for exam papers to be marked. In addition there are some administrative issues with some students being unable to take exams when they are out of town.

In addition students had been confused as to whether they themselves could undertake assessments. In this case, written exam in the format of multiple choice and group project between the students and the supervisor are employed. Multiple choice is used to test students' in breath understanding in all the taught modules, while a project of their own choice is to test students in depth knowledge on a particular area. They are generally required to develop a web site, work out a feasibility, study on security issues, e-business and network planning. They have to go through the process of project management, documentation, coding, verification and presentation. So far, there are over 200 projects that have been implemented by the students. These range from a pizza ordering system to learning courseware. Some projects involve heavily on the multi-media tools such as Flash, Director or VRML, while some involves programming such as JDBC, PHP etc. Some proposals are related to business ideas without the actual implementation such as a business plan to cover search engine and data mining.

Exam board ideally requires an objective, independent project in order to verify the value of individual projects. Students are happy with this arrangement, as there is no delay in the process of projects. For conventional course, some students have become disillusioned, as they have had to wait too long for results. Using this approach, students better understand the process themselves in order that they can explain the importance of an objective assessment process.

A few participated in the course, but did not take formal exams. Of the students who had left the course without taking an exam, the most common reason was that they were not interested in taking an exam, others had thought that the exam would be too difficult. A number of students have suggested that heavy work load have stopped them taking the exam

7 CONCLUSIONS

These certificate courses have proved to be very popular with mature students who may wish to keep up with developments either for career advancement or the acceptance of new responsibilities. These courses aim to provide fundamental design concept, knowledge and skills to students in developing more innovative but practical Web applications, security policy and business applications making use of the Web as a medium. The project has achieved targets in terms of the number of people attending the course and the vast majority of students are positive towards the project they chosen.

The project meets the broad aims of the courses to open up routes into employment for disadvantaged groups. The flexible nature of the project, and the in-depth implementation have been successful. Most notably the project has achieved a particularly high number of real applications.

By providing the Internet related training, the project has been successful in improving the employability of students who have acquired the old computing skills but not the latest Internet related. A relatively high proportion of students had never designed and implemented the Web applications prior to this course.

At project supervision, students have an informal interview to discuss their training needs. This information is used to fine tune the subject contents. A more formal evaluation is conducted against individual lecturer's presentation skill, subject matters, logistics etc. Both surveys are of benefit particularly given the flexible nature of the project. Whilst this survey result could be reviewed on a regular basis, it would provide an element of structure which would cover milestones and qualifications aimed for.

Given the high skill levels of many students, the role of the lecturer and supervisor is key to the success of the courses. Whilst IT support is adequate for most students, there is a small minority who feel that the support available is not enough. A high proportion of those who cannot balance the heavy day time work drop out. Supervisors are always on hand to support students but at busy times they may be limited in the time they can spend with each individual.

Given the interest in training which the project has stimulated, students would benefit from vocational guidance on a more formal basis. These courses also provide students with routes into further training.

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A TQM STUDY OF FACULTY AND TRAINEES' PERCEPTIONS OF PUBLIC VOCATIONAL TRAINING INSTITUTIONS IN TAIWAN

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Index: TQM, public vocational training

Abstract: It is true that the public sector is organic so its degradation is inevitable. Therefore, the continuous review and improvement is the direction for public and private sectors around the world to go lest an organization be doomed to stagnate or wither away. The purpose of this article is to investigate the application of total quality management (TQM) on Taiwan's public professional training institutions; further to redefine a better management for them to keep the active vigor and growth. To avoid the discrepancy between theory and practices, many papers are widely collected concerning the institutional system, character, training category and TQM applications in the world; moreover, such areas as TQM definition and its actual performances and restrictions are the focuses of this article.

1. INTRODUCTION

General industrial experience with TQM practices in U.S. is chronicled from about 1980 with the broadcast of the NBC documentary "If Japan Can, Why Can't We?" which trust W. Edwards Deming and TQM movement to the forefront of North American manufacturing attention. Since then, TQM has spread all over the world. From the cases of the public sector in Canada, France, Germany and Holland, it is common for both private and public sectors to apply TQM with success. Similarly, TQM can be applied on Taiwan's public vocational training institutions without fail if the customary practices are considered and the organizational limits can be conquered.

There are 13 public vocational training institutions in Taiwan which are all affiliates of municipal, corporate body, and central government (Employment and Vocational Training Administration). In the narrow sense, public training is limited to the training implemented by public vocational training institutions. Regarding to Characteristics of Public Training as follows: (1) Institutional and operational expenditures are supported or borne by the government. (2) Job placement is one of the objectives of public training. (3) Training expenses are mainly borne by the government.

Due to resource limited, respond slowly and often lack incentives and recognition in the Public Vocational Training Center. Hence, this study will investigate the faculty and trainees' opinions on TQM and review the difficulties of public training institutions' practices on TQM, with a view to upgrading the training quality.

2. TQM (TOTAL QUALITY MANAGEMENT)

Massey(1992, 49-83) builds the theory of TQM by focusing on the need to redesign the research administration process. He identifies factors that reduce productivity in administrative and support areas along with recommendations for diagnosing problems and understanding the elements for an effective productivity improvement strategy. He raises four conditions that must be addressed for improvement effort: (1) resource constraints; (2) individual and group empowerment; (3) incentives, recognition, and rewards; and (4) strategic thinking. Massey proposes research administration processes at targets for development, his illustrations deal mainly with administrative processes that provides useful view for the management of public vocational institutions in Taiwan. He does not involve the faculty in terms of their perceptions; however, this study will verify the focus group inferences and clarify the faculty perceptions.

3. NATIONAL QUALITY AWARD CRIATERIA

Although there is not a single definition or blueprint for TQM, many examples such as the Baldrige Award criteria propose that leadership sets the environment for deployment through the system while relying on the empowerment of employees and fact-bases management practices. As the related theories shown herein, the National Quality Award Standard Structure covers the substantial content of TQM; moreover, it has been widely established around the world and applied on TQM. As a result, this study, on the basis of Taiwan's customary practices and organizational properties, takes Taiwan's National Quality Award as TQM criteria. Further, apply the indicators of Taiwan's National Quality Award to investigate customers' of public professional training institutions' opinions on TQM and review the difficulties of practices on TQM.

4. PERCEPTIONS ANALYSIS TO STAFF AND TRAINEES

In order to figure out what the opinions of the executives, administrators, trainers and trainees have about TQM's applications on training service quality. The article takes the employees and trainees from 13 public professional training institutions as its questionnaire subject; there are 1500 effective samples to be randomized and 916 feedback. According to the gleaned information, the statistical and inferring analysis is conducted so as to propose instrumental suggestions.

This study focuses on two aspects of importance and difficulty on the basis of variables. In terms of importance, nine indicators are combined to be six variables by factor analysis. They are information application and research development, human development and management, customer services quality assurance and social responsibility, high-rank management, TQM performance and organizational process. In terms of difficulty, nine indicators are combined to be six variables by factor analysis. They are customer services quality assurance and social responsibility, human development and management, high-rank management and organizational process, information applications and research development, TQM performance and quality assurance. For the analysis and discussion, such approaches are used as frequency distribution, descriptive statistics, t-test, one-way ANOVA (Scheffes' after-test will be the alternative for a comparison in case of any significant difference) and two-way ANOVA. (see Figure 1)

The analysis to the faculty and trainees is as follows:

(1) Regardless of personal background, the faculty or trainees all agreed with the importance in the training quality improvement by promoting TQM. (see Table 1)

(2) The faculty subject to such conditions as female, educational background equaling to master degree or higher, aged between 25 and 35 with work title of executives believe that there is no factor important than to upgrade the training quality by TQM. (see Table 2-4)

(3) Among the six factors, the following three draw more difficulty in case of execution:

A. High-rank management and organizational process: Among the faculty, non-executive trainers and administrators of bachelor's degree, aged 25-45 vote on this factor. (see Figure 2)

B. Human development and management: Among the faculty, aged 25-45, seniority of 6-15 years and being employed in municipal governments all vote on this factor. (see Table 5)

C. TQM performance: Among the faculty, those aged 25-45, affiliate of municipal all vote on this factor. (see Table 6)

(4) Among the faculty, executives of master or higher degree think that it is not difficult to upgrade the training quality by promoting TQM; however, among trainees, those with master degree are different from the faculty's opinion. (See Figure 3)

(5) According to the author's interview with the public sector affiliated to municipal governments, it indicates that it is harder to promote TQM by basic units due to the lack in talents and scientific quality control. Therefore, it should be the central authority that is responsible to build a practical system according to the demand of various training institutions, then prevail the system over them.

5. CONCLUSION AND SUGGESTION

Upon the Analysis from the above research, the study provides to set forth TQM suggestions for training institutions and they are hereby described as follows:

(1) Standards and objectives: This section is related to high-rank management and organizational process; it is fundamental but the hardest to carry out, while it will be helpful to promote TQM if public training institutions can set up standards and objectives. Therefore, it is suggested that TQM skills should be documentalized, formed and computerized; also, any inappropriate regulations or laws should be modified. Actually, any policy will never succeed without the support of leading officials. That executives all believe in TQM's essentialty is a beneficial pulse to get TQM promoted.

(2) Resources: Because the resources of training institutions affiliated to the municipal governments have are less than those of central authorities, employees of the latter are more optimistic about the promotion of TQM than those of the former. Thus, the municipal governments should acquire more resources to promote TQM

(3) Communication and execution among institutions: To have a policy performed effectively, it depends on the executive authorities and staff who have to make out TQM objectives, approval standards, performance technology and procedures through all communicating channels. Moreover, such key factors as high-rank management and organizational process, information application and research development, human development should be integrated and cooperated.

(4) Characteristics specific to executing institutions: The characteristics include the level, affiliation, size, organizational structure, staff composition and the external relationship of an institution will effect on the willingness and ability to promote TQM. Also, it should be highlighted on how to create an organization suitable for the TQM culture. Among the thirteen public training institutions, there are two corporate bodies that have stronger attitudes than governmental organizations and encounter less difficulty in performance. Such findings may prove private enterprises have more energy and flexibility, so the government should learn to form an organizational culture of active public services.

(5) Social, economical and political factors: Public training institutions should have a good awareness of the media. To let all citizens agree with the efforts made by training institutions and to win more support. Training institutions should keep constant touch, establish good interactive relationship, set up a complaint feedback system, hold regular surveys on the satisfaction with training program and employment of expertise so that they can identify the disadvantages or achievements of such institutions, revise their decisions and propose determined concerns.

(6) Executor's intention: As the research shown, all faculty and trainees of public training institutions think that it is no doubt to promote TQM and improve the training quality. However, it is a special requirement to instill the policy idea into those of bachelor's degree being employed in municipal government and non-executive trainers and administrators; further to provide opportunities to join in advanced and seminar programs, especially for female faculty. Also, the incentives should be regulated to help employees to get promotion and improve their ability because of advanced program. Additionally, the personnel management reforms should be emphasized. So, this thesis agrees with such reforms on faculty management, suggestions channel and intellectual restoration with a view to upgrade manpower quality and modify work approaches in conformity with the spirit of TQM.

In reality, it will cause great hindrance and confinement if TQM is fully applied to public training institutions; nevertheless, such disadvantages can be removed provided with a harmony between the spirit of TQM and the management of each individual public training institution. As the saying goes, "actions are mightier than words"; no policies are perfect except when they are fulfilled. As our government is devoted to making clerical reforms to build a government of honesty, efficiency and public servants, our national manpower resources will be well-developed; power be fortified, competence be risen supposed with effective TQM applications in line with the economy, society and politics.

6. FIGURES AND TABLES

The definition for D1-D6 and I1-I6 in Figure 1-3 and Table 1-4:

D1: Customer Services Quality Assurance and Social Responsibility D2: Human Development and Management
D3: High-rank Management and Organization Process D4: Information Applications and Research Development
D5: TQM Performance D6: Quality Assurance
I1: Information Application and Research Development I2: Human Development and Management
I3: Customer Services Quality Assurance and Social Responsibility I4: High-rank Management
I5: TQM performance I6: Organization Process

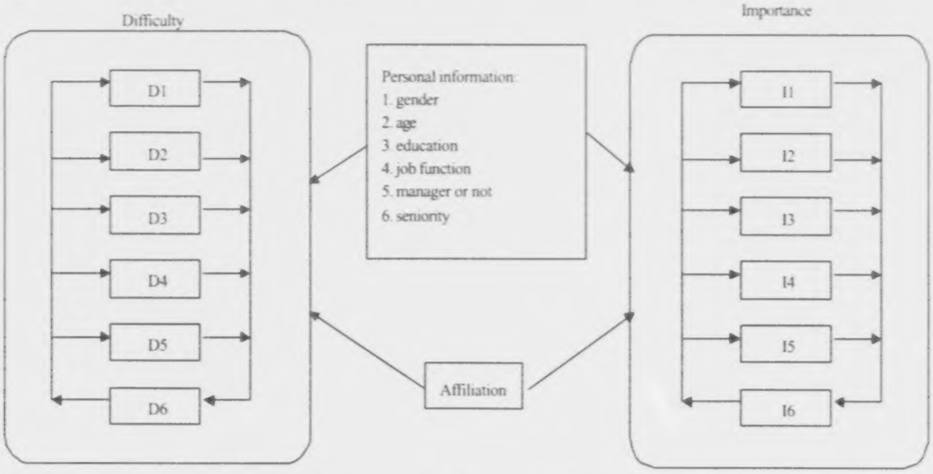
Difficulty
Importance
D1
D2
D3
D4
D5
D6
Personal information:
1. gender
2. age
3. education
4. job function
5. manager or not
6. seniority
Affiliation
I1
I2
I3
I4
I5
I6

Figure 1 The conceptual framework of the study

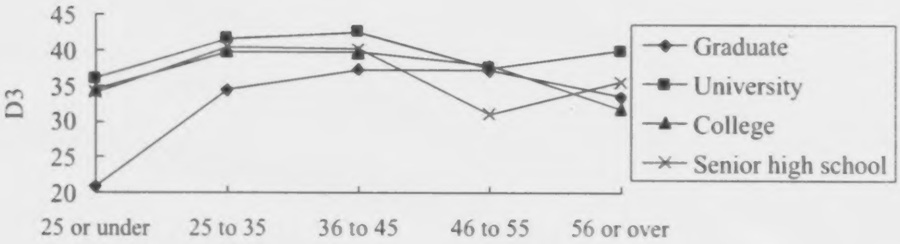

Figure 2 Analysis of difficulty for the age and education of faculty on high-rank management and organization process

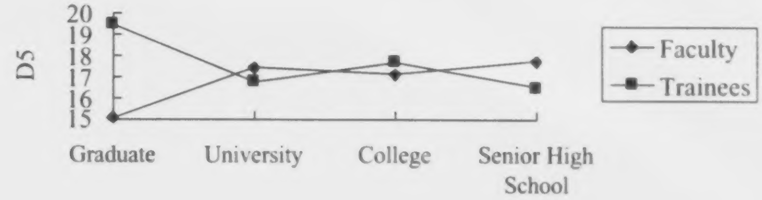

Figure 3 Analysis of difficulty for the education of the faculty and trainees on TQM performance

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Table 1 Analysis of importance for the faculty and trainees on TQM

Variables	Mean			SD			SE			Median
	Faculty	Trainee	Both	Faculty	Trainee	Both	Faculty	Trainee	Both	
I1	63.679	61.036	62.189	9.108	11.515	10.616	0.482	0.533	0.370	45
I2	54.200		54.200	8.576		8.576	0.449		0.449	45.5
I3	84.835	82.481	83.519	11.906	14.467	13.441	0.636	0.686	0.476	60
I4	26.095	24.498	25.204	3.178	4.278	3.910	0.161	0.193	0.132	18
I5	12.405	11.926	12.137	20.74	2.631	2.412	0.105	0.118	0.081	9
I6	29.953	28.794	29.296	4.109	5.455	4.948	0.209	0.243	0.166	21

Table 2 Analysis of importance for the gender of faculty and trainees on TQM (*P < 0.05)

Variables	Sample		Mean		SE		F (prob)		T value for unequality of variances (prob)	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
I1	599	205	61.83	63.35	10.60	10.75	0.044	(0.834)	-1.76	(0.078)
I2	261	100	53.64	55.81	8.66	8.09	0.156	(0.693)	-2.17	.(0.031)
I3	582	199	82.90	85.59	13.24	13.71	0.266	(0.606)	-2.45	.(0.015)
I4	647	213	25.18	25.32	3.84	4.06	0.274	(0.601)	-0.48	(0.631)
I5	657	217	12.09	12.34	2.45	2.30	0.842	(0.359)	-1.33	(0.184)
I6	650	218	29.10	29.90	5.00	4.82	0.920	(0.338)	-2.08	.(0.038)

Table 3 Analysis of importance for the education degree of faculty on TQM

Variables	Sample				Mean				SD				SE			
	G	U	C	H	G	U	C	H	G	U	C	H	G	U	C	H
I1	22	103	166	57	64.82	63.86	63.79	63.26	7.001	9.961	9.066	8.276	1.493	0.982	0.704	1.096
I2	22	107	162	64	54.45	54.89	54.05	54.14	8.337	8.618	8.604	8.395	1.777	0.833	0.676	1.049
I3	21	101	153	66	85.43	84.10	85.19	85.76	10.31	12.48	12.15	11.09	2.249	1.242	0.982	1.365
I4	24	116	173	67	26.50	26.18	26.07	25.84	3.007	3.220	3.274	3.033	0.614	0.299	0.249	0.371
I5	25	114	175	69	12.20	12.54	12.42	12.42	1.607	2.117	2.118	2.032	0.322	0.198	0.160	0.245
I6	25	111	173	67	29.72	30.17	29.86	30.10	3.373	3.917	4.392	3.806	0.675	0.372	0.334	0.465

(G: graduate, U: university, C: college, H: senior high school)

Table 4 Analysis of importance for the age of faculty on TQM (Y1: <25, Y2: 26-35, Y3: 36-45, Y4: 46-55, Y5: >56)

Variables	Sample					Mean					SD					SE				
	Y1	Y2	Y3	Y4	Y5	Y1	Y2	Y3	Y4	Y5	Y1	Y2	Y3	Y4	Y5	Y1	Y2	Y3	Y4	Y5
I1	14	86	166	69	16	63.50	65.13	63.23	63.72	60.88	8.582	9.143	9.548	7.787	9.722	2.294	0.986	0.741	0.938	2.431
I2	18	86	165	72	17	51.44	56.03	54.27	53.38	51.76	8.241	8.064	8.383	8.898	10.53	1.942	0.870	0.653	1.049	2.555
I3	17	82	158	73	16	83.59	87.27	84.23	84.27	83.13	9.709	11.73	12.31	11.26	14.31	2.355	1.295	0.980	1.318	3.578
I4	18	89	180	77	19	25.89	26.43	25.82	26.36	25.74	3.123	3.457	3.261	2.738	3.016	0.736	0.367	0.243	0.312	0.692
I5	19	91	182	76	18	11.95	12.80	12.34	12.37	11.94	2.013	2.056	2.074	2.071	2.461	0.462	0.216	0.154	0.238	0.580
I6	18	88	180	75	18	30.17	30.76	29.60	29.95	29.61	3.434	3.686	4.497	3.672	3.310	0.810	0.393	0.335	0.424	0.780

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Table 5 Analysis of difficulty for age, seniority, affiliates of faculty on human development and management (*P<0.05)

Factors		Sample	Mean	SD	SE	Scheffe'
Age	①25 or under	18	.32.2222	8.0114	1.8883	② >① ③ >① ③ >④
	②26-35	82	.40.8659	11.6479	1.2863	
	③36-45	165	.40.9455	10.5016	0.8175	
	④46-55	72	.35.6806	9.1341	1.0765	
	⑤56 or over	16	36.3750	11.1587	2.7897	③ >① ④ >①
Seniority	①under 1	17	32.4706	8.0709	1.9575	
	②1-5	50	40.5000	11.5851	1.6384	
	③6-10	73	41.3425	10.5228	1.2316	
	④11-15	96	41.2188	10.8105	1.1033	
	⑤16 or over	97	36.6082	9.6583	0.9807	
Affiliate	①Central government	165	.37.7333	10.8274	0.8429	② >①
	②Municipal government	153	.41.2288	10.9229	0.8831	
	③Corporate body	39	37.1795	8.7475	1.4007	

Table 6 Analysis of difficulty for age and affiliation of faculty on TQM performance (*P<0.05)

Factors		Sample	Mean	SD	SE	Scheffe'
Age	①25 or under	18	15.2222	3.7816	8913	③ >④ ② >④
	②26-35	87	18.1609	5.1487	0.5520	
	③36-45	174	.17.7701	4.5900	0.3480	
	④46-55	74	.15.6892	4.5749	0.5318	
	⑤56 or over	17	15.3529	5.3026	1.2861	
Affiliation	①Central government	172	.16.5116	4.9329	0.3761	② >①
	②Municipal government	158	.17.8228	4.8945	0.3894	
	③Corporate body	45	17.6222	3.7434	0.5580	

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CURRICULUM DEVELOPMENT IN VOCATIONAL EDUCATION: ACHIEVING BALANCE AND COHERENCE

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Index: Curriculum Development, Balance, Coherence, Relationships, Change

Abstract: In the era of lifelong learning, with the potential of new information technologies to facilitate learning and assessment, the need for curriculum balance and coherence is as important as ever. Lessons from the past should be applied to future development. Over specification of curriculum requirements must be avoided, alternative viewpoints of coherence accommodated, and continuity in development sought. Curriculum components should be in balance, with appropriate emphasis on valued learning experiences. Emphasis should be given to developing key skills in breadth and depth, and to a balance of accountability and flexibility. A template of interrelated key descriptors is suggested.

INTRODUCTION

The context

The development of VET curricula and qualifications is needs to be flexible. Curriculum structures must be responsive to changing knowledge, skills and technologies, keeping up with the pace of industrial and occupational change, and to changing learning environments. Curriculum provision needs to accommodate the varying needs and intentions of learners to progress both to higher levels of education and to employment opportunities. The curriculum must provide a foundation for the future, develop individuals' confidence towards meeting unforseeable needs, and enable them to build their achievements into personal qualifications. No longer can an individual expect lifetime employment with a single employer. In our 21st century society people must grow to take responsibility for their own development, with expectations that employers will support them where this is applicable to their needs.

Concepts for characterising recent and future curriculum developments in Europe have been reviewed and developed (Kamarainen, 1999). In the USA the 'Tech Prep' programmes demonstrate the development of integrated curriculum standards and the contextualisation of learning (see for example Hull and Greville, 1998). In the UK emphasis on national control of qualification and curriculum content and quality has increased, and attempts are in progress to bring initial vocational and academic education closer together in one framework (Qualifications and Curriculum Authority, 1999) in response to the continuing calls for rationalisation and coherence of provision. But there is need to ensure local (college and school) providers can be responsive to the needs of the economy and of employers, and increasingly for individualised rather than institutionally based learning.

In the UK, and no doubt elsewhere, there are important lessons about curriculum development processes, to be learned from previous changes. This paper illustrates some of these lessons, drawn by the author from his involvement in vocational curriculum development and evaluation (in England and Wales), that should be applied when seeking to ensure balance and coherence in curriculum provision. The purpose is to stimulate thinking about their relevance and applicability in curriculum change for life long learning with information technologies.

THE BUSINESS OF CURRICULUM DEVELOPMENT

Curriculum development generally follows a pattern of deliberate planning, which involves the stages of situation and needs analysis, design, implementation (delivery) and evaluation. These stages occur mainly consecutively with some concurrent activity. Most curriculum development is undertaken in response to identification of the need for action, to revise existing provision and sometimes to create quite new provision.

Successful curriculum development requires systems thinking, that is to say to consider at all times the whole of the system (and the interrelationships in the system) and not just the parts – to consider the effect of decisions made in one area upon another. This need is as paramount in the age of new information and learning technology and lifelong learning as before. A systems approach seems so obvious in principle and yet can be so difficult to practice. The often quoted curriculum theorist and psychologist Jerome Bruner (1966) said 'a curriculum is a thing in balance, which cannot be developed first for content, then for teaching method, then for some other particular feature'. How true this remains!

Successful curriculum development involves achieving balance and coherence:

- in the relationships between the components of learning – the aims and intended outcomes, the content - the knowledge and skills, the learning experiences, the assessment; and
- in the relationships with and between people, through accompanying staff and institutional development, attending to the staff and organisational implications of the proposed curriculum and qualifications, whether in the macro (national) context or involved in implementation (the local institutions and providers).

By balance is meant a state of harmony or equilibrium of the parts which make up the whole. By coherence is meant the logic and consistency in the relationships between components so that they are planned and fit for purpose. We need balance and coherence in the processes of changing the curriculum, in the design and in implementation.

There should be a balance, for example between:

the need for regulation of qualifications and the need for flexibility and responsiveness to demands;

serving national economic and industrial needs, and individual and personal needs;

general core knowledge and skills, and employer needed knowledge and skills;

immediate and longer term needs;

national/ central control and local control.

To achieve and maintain balance requires compromise between alternatives.

SELECTED LESSONS WHICH SHOULD BE APPLIED

- **IN CHANGING CURRICULA AND QUALIFICATIONS**

Four general lessons towards achieving balance and coherence:

Over specification of the curriculum must be avoided - the requirements which curriculum designers choose to specify, subsequently on implementation take precedence over matters which are not specified regardless of their relative importance. Clearly the curriculum specification - the aims, the outcomes, the content, the assessment requirements must be addressed by students and teachers. However a specification naturally constrains the behavior of teachers and learners, and to such an extent that other potential beneficial outcomes and behaviors are restricted and may not occur. It is important therefore to avoid over-specification and to control strategic matters but not to seek to control the detail. Care must be taken that what is measurable does not displace what may be equally important.

There will be alternative views about what is coherence. Coherence may mean different things from the viewpoints of the designer (coherence in theory), teacher (delivery coherence), learner (personal coherence) or employer (user coherence). It can be argued that personal and user coherence are particularly important. The advances in information technology give greater opportunity to demonstrate what is important and the curriculum framework must enable a flexible response. Combinations of knowledge whether academic or vocational, general or job specific must be possible and a common template can help to assure parity. Students have differing interests, motivations, employment needs and not least prior knowledge and experience. A coherent curriculum will enable them to make choices accordingly, with guidance and support.

Continuity in development is necessary, making changes in the light of continuing evaluation of past provision, but not based only on the most recent evaluation. Developers and managers with new responsibilities are keen to learn from the lessons of the immediate precursors, but so often do not allocate the time or resources to look back at earlier provision and evaluations. In making changes which may be needed, don't destroy the good and successful aspects of the old in creating the new, but build on and enhance the past.

Reasons for resistance to change must be respected and understood, but innovation is doing new things to achieve new purposes and successful curriculum innovation will involve a mixture of strategies. Change requires concomitant resource use and should take the longer view.

- **IN CURRICULUM DESIGN**

It is necessary to have a balance, an equilibrium, between the key components of the curriculum - the objectives (intended outcomes, competencies); the knowledge and skills content – key concepts, key skills; the learning experiences – key activities; the assessment strategies and methods, giving due accent on learning experiences and modes, and the crucial nature of work related experience.

In developments in the UK, for example, over a period of time different innovations have emphasised different components to the relative exclusion of others, resulting in curricula out of balance and need for further change.

The specification controls intentionally the shape of the curriculum, but so often designers' decisions introduce constraints unintentionally, without appreciating the effects they will have on learning. For example emphasis on detailed objectives/outcomes and assessment criteria (as introduced by the Technician Education Council in the 1970's, and again in the development by NCVQ of General National Vocational Qualifications, GNVQs, in the 1990's) led to an imbalance with respect to learning experiences and unanticipated effects on the use of time by teachers and by students. If we demand too precise or too extensive objectives, or if the assessment system is too tightly defined, then the constraints may prevent creative teaching and learning. As Eisner (2000) states 'as objectives and standards become more precise they proliferate and swamp teachers' capacity to deal with them.' Similarly if content is specified in detail, accompanied by a tightly controlled external assessment regime with a view to achieving externally controlled standards, a consequence may be inflexibility and responsiveness to students interests and motivations, and to employers needs. So the appropriate course of action is to consider the implications and interrelationships of the key curriculum features required and set up processes which control the quality of operation (e.g. to ensure that learning is not being attempted for which resources are not adequate).

Overcome the reluctance to state learning experiences and activities. While a list of mandatory learning experiences and activities could become as stifling as over explicit objectives and assessment, failure to specify learning activities which are known to be beneficial means opportunities missed to shape the direction of learning. At this time of rapid expansion of electronic communication it is vital that there is sufficient flexibility for learners to use these newer leaning environments, and to critically appraise their use. Contextualised learning must be emphasised with attention to active modes of learning. As Lave (1991) says, 'knowing' is never context free and learning is a 'social collective phenomenon' rather than an 'individual psychological one'. Work experience and work based is crucial. A curriculum statement must be a stimulating statement, which enables methods to be chosen to meet the need of individuals.

Avoid over prescription and over specification, of any one component at the expense of others. Alternative practices should be evaluated to determine the optimum style of specification.

For example, so often in curriculum development, at least in the UK, have assessment issues and control dominated concerns. Recognise that assessment is usually a sampling process in which methods must be related to the kinds of outcomes.

- **IN CURRICULUM IMPLEMENTATION**

In curriculum design the focus is on defining the learning which should take place. On implementation the curriculum becomes the medium through which teachers and learners interact.

Key skills must be developed in appropriate breadth, and extended in depth (to a higher level), rather than those already achieved rehearsed. It should be the learners' concern and must be the teacher's role to ensure each overcomes their individual knowledge and skills deficiencies, and that their skills are extended and new skills developed rather than time spent on rehearsing existing skills without progression. A great deal of emphasis has been placed on designing skill deficiency tests and processes of monitoring skill development through logbooks and profiles. It is the teacher's job to educate (lead) the student forward to achieve new skills. It has been my experience that students who have mastered certain skills at a particular level, may be given further practice at that level rather than their development extended to a higher level or time spent on developing other skills in which the student is deficient. The challenge is to combine breadth and depth for the individual and recognise the breadth of skills required. While emphasis is being placed in the UK (and elsewhere) on the skills of 'application of number', 'communication' and 'information technology', which now form a new Key Skills Qualification, and on the skills of 'working with others', 'learning to learn' and 'problem solving', there are others, notably for example, working independently and flexibly, being entrepreneurial and self motivated, handling financial affairs. Emphasis must be on developing individuals' capability to plan their own learning. Problem solving requires being able to apply knowledge and conceptual understanding in undertaking tasks in particular areas.

An appropriate balance must be managed between the accountability required for quality and the flexibility which engenders creativity. Many regulations and constraints may ensure quality within a given framework, but at the expense of flexibility and creativity. This is true for the work of both teachers and learners. Coherence may be achieved through quality systems which monitor among other things: programme delivery, learner support structures, activities and assignments which integrate key skills, team work by teachers and students, communication between teachers and students, good leadership in touch with the learners, and evaluation of the impact of the curriculum upon them.

Avoid assessment overload, recognising that assessment of learning is a sampling process. Distinguish clearly between the role of assessment in the process of checking and reinforcing learning and assessment to measure achievement or competence. In a national qualification system balance local, internal assessment, and external assessment. The use of information technology gives opportunities for the management of assessment giving flexibility of time of testing, objectivity, for updating, and for feedback. Information technology enables the development of interactive questions and virtual problem solving. Nevertheless, a balance is needed with assessment methods which involve the judgements by qualified teachers of assignment work, portfolios, projects and other evidence following their interaction with students, and subject to independent moderation processes.

Do not underestimate the time needed for learning and achievement. Aptitudes of individuals must be catered for. Younger learners, those returning to learning, and learners in new territories, need an external structure in which learning is managed and supported. They need initially at least, help with managing their learning and towards becoming more autonomous. Most learners need to interact with others as part of the process of learning.

IN CONCLUSION

In the light of the above, a template for the specification of a curriculum with a unitised structure, might comprise

(a) the key descriptors at national (or sub-national) level which embrace the wide range and, in principle totality, of all possible curricula and qualifications, which enable kinds of learning and achievement at specified levels to be combined, and provides pathways for progression;

.(b) the key descriptors for the curriculum for the individual learner, or group of learners with similar needs.

(a) Descriptors of the National (or sub –national) framework might be:

Programme Area
    Title and Level
    Purpose and Aims
    Structure - Combinations of Units, core and optional Units, rules of combinations
    Key skills - integrated and contextualised
    Work experience/work related requirements
    Assessment strategies
Units of Achievement (National or sub-national or local)
    Title and Level
    Pre-requisite knowledge, skills and experience
    Learning Outcomes (with assessment criteria)
    Content: Knowledge and Skills
    Content: Learning Experiences
    Assessment methods
    Indicative resource- based, individual, and group learning opportunities

(b) Descriptors of the curriculum for the individual learner might be:

Criteria for choice of programme and Units:
    Relevance to future work and/or educational progression opportunities
    Relevance to personal interests, motivations and needs
    Aims: short and long term
    Key skills - levels and breadth

Chosen Programme and Units:
    Aims, learning outcomes and content
    Timetable
    Learning arrangements: work based - work experience
        learning centre based / teacher led / independent
        group work with other learners
        interaction with learning materials and resources
    Assessment arrangements: as required by Units

Continuing evaluation of progress

Identification and review of personal pathway and progression

Some unforseen and unanticipated learning experiences may arise within individuals' programmes from their working and social contexts and interactions. A balanced and coherent curriculum will accommodate the consequential and important beneficial outcomes.

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PROVIDING COMPETECY-BASED EDUCATION FOR INDUSTRY AND ITS EFEECT ON CLASSROOM EDUCATION

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Index: Pro-trainer one; competency-based education; vocational training

Abstract: This paper is set upon the scenario of a synergy from two leading technical education institutions in their joining exercise of providing an industry-oriented curriculum for a university level degree course. A course model of *Pro-Trainer One* is devised to foster this initiative at the first evaluation year in which the result was demanded to be effective. The strategy of developing material toward this exercise is demonstrated and the evaluation of this synergy is also examined. The newly established Taishan Training University was meant to become a model in which prospective collaboration among many institutions can follow.

INTRODUCTION

This paper aims to evaluate how to establish mentoring strategies for higher education system, particularly those technical and scientific curriculum based universities to provide their teaching expertise directly to industry. In the year of 1998, a synergy was formed by merging from two leading institutions, National Taipei University of Technology (NTUT) and Taishan Vocational Training Centre, to found the Taishan Training University (TTU) in Taiwan, the first of its kind in this country. The goal of this program is primarily to be in line with the government's policy in developing domestic high-tech and advanced cooperation from education and training expertise, and also raising the best technical manpower both in theory and skill. This joint strength in both academic and industrial institution will provide degree courses for prospective trainers and develop techniques that are interchangeably leveraged from academic system and real world practise. The strength and weakness of this model are examined and some spin-offs received by participants in this course are also addressed. Due to the fact that a correlated nature of technical education and industrial curriculum developing system, many advantages from this collaboration also give birth to many developmental tools that can be utilised by these two institutions.

Upon the completion of training cycles, the professional trainer would be able organise, execute and evaluate professional industrial training programmes and elevate the level of professional ethics and encourage an attitude of respect for one's work so as to become an instructor or a person who can carry out teaching in training institutions or particular field of industry.

Current Professional Education at the University level in Taiwan

As far as Electrical Engineering (EE) is concerned, the distinction between general-purpose universities who offer degree courses in EE and the technical universities is that the technical universities have more number of departments dedicated to the same wider theme of professional education, such as in EE. In other words, EE department in technical universities is often split into more than one departments, from Electrical Engineering, Electronic Engineering, and even Computer Engineering, to name a few. The EE degree is a general course that covers disciplines in Electricity, Electric Machinery, Communication, Computer, Control, Semiconductor, Electronics, Electric-Optics, etc., An example of Electrical Engineering Department run by NTUT shows that it tends to cover Electricity and Control, while Electronic Engineering Department tends to include Electronics, Computer, Communication, etc. This will often result in the situation that the students in Electronic Engineering have less experience and poorer picture of wider applications of Electrical Engineering. Same thing also happens to Electrical Engineering students who also lack knowledge in Computer and Communication. This presents a major problem in the modern technology the integration from many technologies is highly pursued and each discipline is correlated. As a result, students are confronted with the challenge when they are in the midst of re-inventing their career by exploring other related professions.

The EE program in the Taishan Vocational Training Center aims to integrate these two curriculums and offer a higher level of competency in the physical jobs environment. Based upon the current resource in NTUT, this program not only inherits the benefits from each Electrical Engineering and Electronic Engineering can offer, but also creates courses opportunity of their integration in which students can opt for modules from both categories. The program also shortens the length of study from three years to two years, but the time of actual course hours is remaining the same in total.

A Degree Ready for Industry

"Meet up with Real World Practice" is another vision targeted by both NTUT and Taishan Vocational Training Center, although NTUT is much more involving with laying down a firm foundation in theory. On the other hands, Taishan Vocation Training Center admits students who must have a two-year college degree and most students admitted reveal that they can enter the industry directly and smoothly after this comprehensive degree program, while the students in NTUT might consider to enter a higher level of research in post-graduate study. This offers two different perspectives that the synergy from the two institutions must take into account thoroughly. Therefore, this program has a higher percentage of lab works and on jobs training and this forces students to be imposed to the real world.

A Degree and also a Certification in Industry

To develop an effective training model for the unique program, the *Pro-Trainer One* curriculum has a special emphasis on the acquisition of certification that is highly favored by industry and trainees. A survey of the trainees in this program on the shows that more than 50 percent of students wish to acquire professional certification which is offered as a feature in this program.

The program can end up with university degree in EE and/or *Pro-Trainer One* degree. However, it has been a policy administered by Education Ministry that 72 credits hours are compulsory while for students also within *Pro-Trainer One* degree have to pass 1800 hours of on-jobs exercise which is also specified firmly by the country's Labor Ministry for anyone wishing to obtain a certification in teaching as a trainer and therefore this makes a total hour of 2500 within one year. This results in a very intensive course arrangement in this trial scheme. Students almost have to study from Monday to Sunday, in which Monday to Friday morning, courses are conducted at Taishan Vocational Training Center and Friday afternoon to Sunday at NTUT.

EVALUATION

Evaluation and observation of this program at Taishan Vocational Training Centre will be shown it to be a very useful and systematic method in developing material.

Feedback from the students:

A questionnaire is designed to understand how effective the program can deliver to the student. Among the valid 112 samples, the following fact is revealed (Lo and Hwang, 2000):

1. The level of satisfaction of the overall program: Over 60 percent of students has a satisfactory feedback;
2. Over 60 percent of the students feel that the course hour is too intensive the loads on the student is very heavy;
3. Over 90 percent of the students acknowledge the program can be organized in two year of length.
4. Theorem-based courses should be instructed by NTUT while lab-based course to run by Taishan Vocational Training Center to reduce the overlap and thus the load for the students.

The Synergy of provision Pro-Trainer Degree

At Taishan Vocational Training Centre, with its Human Resources Training and Development team, this initiative is continually provided the opportunity of growth and update as the relationship established based on reasonable subsidiary scheme. For example,

(1). The purchase of software: This scheme allows the unit to purchase software in the light of teaching and compatibility between software usage at two sides

(2). A grand opportunity of mastering professional drawing systems, such as AutoCAD.

(3). Due to the founding nature of this scheme and the high allowance of budget available form government, this unit has been introduced to some of the state-of-the-art training facilities.

(4). Classroom styles and techniques are taught at Taishan Vocational Training Centre. Instructors received better skills of presentation skills.

(5). On of the greatest benefits in working at Taishan Vocational Training Centre is given the opportunity of access and see the first-handed types of electrical and electronic engineering technology that is prevalent nowadays.

These are only few of the advantages working with Taishan Vocational Training Centre. The tests of our abilities and providing knowledge and dependability have also been a challenge. This is rewarding and worthwhile experience for all the staff and experts out from NUTU who devoted themselves in this initiative.

DEVELOPING PRO-TRAINER ONE CURRICULUM FOR THE FEEDBACK

Taishan Training University (TTU) and National Taipei University of Technology (NTUT) are going to set up with the strategy to develop a training model for the prospective education system in this country. This involves with the study to devise course materials that must be highly effective. *Pro-Trainer One* thus comprises the following steps (Analoui, 1993):

1. Constructing a Task Analysis;
2. Performing a Behaviour Analysis;
3. Writing up Criterion Tests;

4. Selecting Instructional Strategies
5. Developing instructional materials
6. Validating instructional materials.

When the above tasks are comprehensively studied, a trainer should be capable to demonstrate their proficiency in producing sound and well-organised programs that will meet the specific needs of selected groups in electrical engineering facility. The following is a brief account of how each of these items works and an explanation of further usage in Pro-*Trainer One*.

Constructing a Task Analysis

A task analysis is an instructional tool exploited by developers or trainers, which would assist them identify which major task that a trainee must carry out and what subtask that will help trainee accomplish within one parental task. This coherent approach will offer an insightful analysis to each specification and a clear picture of what the trainee is expected to accomplish in succeeding any given course, (Dryden, 1999; Birnbraver, 1985)

The most effective method that can also be employed in commencing a task analysis is by means of querying: *What do I want the trainee to do or perform after getting through the training program or one unit of instruction?* The program courses units must be broken down to tasks and subtasks following by the analysis of target population (trainees) who will be going through the materials that are being developed. One can start by identifying those most relevant and stop at the point where one wants the learning to begin (Milano, 1998; Arwady, 1987).

Performing a Behaviour Analysis

Behaviour analysis is one of the more sophisticated tools that are applied in the Pro-Trainer One developing process. Principally, it is to measure or determine the proficiency of a person's skills associated to a performance specified by the task analysis (Somekh & Davis, 1997; Esseff, 1986). It is therefore, in reality, that behaviour analysis acts as a bridge between the task analysis and criterion test items. The behaviour analysis poses the question: *What behaviour is required to fulfil the task?* The major types of behaviour that can be analysed: *Cognitive*, *Psychomotor,* and *Effective*. Cognitive behaviours are the intellectual or mental skills, which fall into the hierarchy of behaviour in this category (Rae, 1997). They consist of:

(1).Recall;(2).Recognition;(3).Multiple-discrimination;(4).Concepts/principles:(5).Problem solving.

Effective behaviours are commonly referred to as *Emotions*, *Values*, *Attitudes*, and *Feelings*. However, effective behaviours can have an effect on the cognitive and psychomotor behaviours (Esseff, 1986).

Effective behaviours may comprise, but are not limited to:

(1). Leadership; (2). Responsibility; (3). Initiative; (4). Resourcefulness; (5). Bearing and behaviour (body language)

In Pro-Trainer One, it is essential that each of the behaviours of trainees be assessed, especially in jobs, which deal with interpersonal contact with customers, clients, etc. The behaviour analysis is then integrated into the task analysis to determine the most appropriate means to effectively test learners (Esseff, 1986).

Writing up Criterion Tests

The term criterion test is often normally regarded as criterion-referenced test item. The word *referenced* is used to clarify its meaning. The word criterion means standard. In the criterion test items, the standard is the performance set by the task analysis.

A criterion test item is referenced to one specific task, which is readily identifiable. Hence, when a trainee looks at a test, which is made up of this sort of question, he or she should be able to determine precisely which task is measured by each test item. The value of the criterion test items stem form two points:

(1). The item refers to, or mirrors, one predetermined task.

(2). It measures the directed learning, which has taken place.

The criterion-test item can be best described by the following guidelines: Teach (a) only what will be tested, and (b) everything that will be on the test; and test (a) only what has been taught, and (b) everything that has been taught.

Selecting Instructional Strategies

This topic plays a critical part for learners' retention, and deals with instructional strategies. Instructional strategies refer to a mixed-use of modes, media, and environment selected to carry out instruction. Instructional strategies are used to present the information identified in the task analysis, collect the response from the learner, and provide feedback to the learner. In deciding the appropriate instructional strategies, there are three questions the instructors/developers must query themselves: (a) in what modes that an effective instruction can be ensured, (b) with what media can yield an effective instruction, and (c) in what environment that an effective instruction can be obtained. Instructional modes are described as methods for presenting information, collecting responses, and providing feedback (Henerson, Morris, & Fitz-Gibbon, 1987; Feldman, 1985).

Instructional media are those resources that are used to present information (stimulus), collect responses, and provide feedback. They also act as a reinforcement to supplement other methods of delivery. Certain media are more appropriate than others for presenting tasks. For example, generally, tasks ad subtasks fall into three main categories: (a) People-to-People tasks; (b) People-to-Paper tasks; and (c) People-to-Machine tasks

Each media has its own advantages and disadvantages and this needs considerable investigation to find out the best media. Statistics today shoe that a combination of all of these media is required in order to maximise learners' retention (Ashton, 1999; Feldman, 1985)

There are four major environments where learning may take place:

(1). Classroom environment: (2). Independent study: (3). Skills labs: (4). On the job: In Pro-Trainer One, the course takes place in classroom, skills labs and also on-the-job and the independent study is left to the trainee to accomplish.

Developing Instructional Materials

Instructing methods are highly associated with learning environment, and the selection of media. Current statistics shows that a mix of media and environments can optimise retention for the learner (Feldman, 1985). When considering instructional materials for Pro-Trainer One, two primary concerns are addressed: (a) *How can materials currently available be used or adapted to allow learners (trainees) to carry out tasks designated in the task analysis*, and (b) *how can new materials be developed from the task analysis?*

There are a number of criteria should be aware of when developing instructional materials:

(1). The materials must meet the needs of the targeting population;

(2). The materials must make use of the design documents developed;

(3). The materials must be interactive;

(4). The materials must state objectives at the beginning of each module.

In other words, if the materials are enough to meet the requirement, there is no need to develop more. In summary each design document and its practical application in document or evaluation is as follows:

(1). Tasks identified in the task analysis will provide the content for programmes and instructional materials;

(2). The behaviour analysis will be utilised to determine what types of knowledge and performance tests requited for development;

(3). The sequence of the tasks will be mapping to the learning hierarchies and courses outlines;

(4). The programmes will be modularised and broken down to a number of units in order to make them more accessible under various conditions of time frame limitation and participants interests.

Validating Instructional Materials

The closing step in the development process for Pro-Trainer One is the validation process. It is probably the most important steps since it is the real assessment to ensure that the initial criteria is gained. It is essential to make the courses a success.

In applying Pro-Trainer One, it is to bear in mind that the targets of validation are the materials rather than the trainees. The material might not be fully suitable but it needs people's feedback and revision until the targeting population of learners achieving a score of 90% or higher of instructional objectives set at the beginning. The main criterion here is to ensure that those items tested ate actually covered in the material provided. Often some items of interest deemed necessary and tested are not really covered in the material. Therefore, validation and re-validation may be necessary. One more item to stress in the industrially designed curriculum is to prioritise the arrangement of information by the task analysis and to make sure in the development process that appropriate coverage of the material is provided.

CONCLUSION

The professional methods of planning, developing, and delivering the material has equipped the team at National Taipei University of Technology highly professional within a pretty short span of time. The benefits to NTUT are explicit and the teams have experienced a good teaching atmosphere with more up-to-date software and hardware. The feedback to the academic system and technical education here at NTUT is overwhelming and the opportunity of working in a cross faculties and disciplines also brings to this initiative an enormous benefit and improvement in teaching and research. In the technical education ground, students are more confronted with challenge in job markets where the competition is fierce. However, the road to developing industrial favoured curriculum still has many challenges to overcome. Working with such a multifaceted project, multitalented group of individuals has presented another issue in the realisation of synergy. Though all the phases of delivering a better result, this initiative has always preserved and some other benefits are yet to be realised from establishing the partnership between two leading industrial institutions in Taiwan.

A large number of faculty staff will have the opportunity to take classes, instruct lectures, and develop materials. Though much of this achievement will be reviewed and this type of refresher in theses processes is of benefit to anyone who was involved. The overall gains in the program for NTUT is virtually not predictable but will be realised through affiliation.

It is the long-term commitments for NTUT for the industry but some of the tasks are beyond normal administration scope and process and that means the gains is still debatable. Though all of the difficulties to date have been overcome. This also had seen a considerable stress on the staff working under this collaboration initiative with the partner institution. Long hours and a lack of qualified or interested personal who would be willing to involve has also put a strain on those of staff working with Taishan Vocational Training Centre. The amount of workload with usually short turnaround time has placed a challenge for team at NTUT, if flexibility had not been factored, could have been avoided.

Overall, this synergy has enabled those staff that worked at Taishan Vocational Training Centre to gain higher capability through delivering the successful result. This also strengthened the academic institution capability in practising vocational education and established a firm link between the education professionals both in academic and in the industry.

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COMPETENCY BASED TRAINING: AN EVALUATION OF A POST-SECONDARY TEACHER EDUCATION PROGRAM

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Index: Competency Based Teacher Education

Abstract: The purpose of this study was to evaluate performance-based teacher education (PBTE) in Arkansas, United States. PBTE is an approach to teacher education in which a person is required to demonstrate essential teaching skills in an actual teaching situation. It is a competency based education program for individuals who plan to be instructors at postsecondary technical institutes. The sample was 74 technical instructors at 11 postsecondary institutes in Arkansas. The competency categories rated highest by the instructors were instructional planning, instructional evaluation, serving learners with special/exceptional needs, and teaching adults.

INTRODUCTION

Performance based teacher education (PBTE) is a system which introduces teaching skills in an educational environment and requires teachers to demonstrate knowledge of these skills in a classroom or lab setting. "Actual performance of the tasks insures that the teacher has not only the knowledge required, but also the ability to perform the competencies (teaching skills or tasks) that are essential to successful teaching" (Hamilton & Quinn, 1981, p. 7). PBTE is a training program that is individualized, focuses on outcomes and allows flexible pathways for accomplishing the outcomes. It makes clear what is to be achieved and the standards by which the achievements are to be measured (Kerka, 1998). PBTE requires more planning and organization than traditional education as well as an extensive process of identifying relevant skills needed in a teaching position, organizes those skills so that learning activities can be developed, requires hands on materials, delivers instruction with nontraditional methods, and requires extensive record keeping (Foyster, 1990).

PBTE in Arkansas Technical Institutes

The approach to PBTE in Arkansas technical institutes focuses on competency based education for individuals who plan to be instructors as well as those who are already instructors. The materials used for this program are a series of modules developed by the Center for Vocational Education located at the Ohio State University. The design of the materials was funded and sponsored by the U.S. Office of Education and the National Institute of Education.

This research-based program uses 132 separate learning packages, called modules, which focus on 400 professional competencies found to be important to occupational specialty instructors. They are designed for use by those responsible for professional development and teacher training. Each module was extensively field tested in staff development and teacher education programs at

18 institutions of higher education. The evaluations and field tests resulted in self-directed learning experiences that integrate theory and application. After completing the self-directed experiences, the instructors demonstrate the application of the theoretical information in an actual classroom setting (Fardig, Norton & Hamilton, 1977; Hamilton & Quinn, 1981).

In 1982 the Arkansas Department of Education, Vocational Technical Education Division, began a professional development program for all instructors hired into the state's postsecondary technical school system. The purpose of the program was to provide professional development opportunities for the instructors teaching in technical areas. The PBTE program developed by the National Center for Research in Vocational Education addressed these teaching skills (Andrew, 1987). All instructors in the state system were either occupational specialists hired directly from industry to teach technical courses in areas of trades, literacy, business, health, and academic skills or trained as content area secondary teachers. Their students were training to enter industry jobs.

A university vocational teacher educator coordinated the Arkansas PBTE program. The primary responsibility of this teacher educator was to observe instructors demonstration of knowledge, skills and attitudes required to perform a given teaching competency. The teaching competency areas identified within the PBTE program were as follows:

Category A: program planning, development and evaluation
Category B: instructional planning
Category C: instructional execution
Category D: instructional evaluation
Category E: instructional management
Category F: guidance
Category G: school-community relations
Category H: student vocational organizations
Category I: professional role and development
Category J: coordination of cooperative education
Category K: implementing competency based education
Category L: serving learners with special/exceptional needs
Category M: assisting students in improving their basic skills
Category N: teaching adults

PURPOSE OF THE STUDY

The purpose of this study was to evaluate the usefulness of instructional materials used in the Performance Based Teacher Education (PBTE) program used in Arkansas. These materials were the 132 modules developed by the Center for Vocational Education.

METHOD

Sample

The participants in this study were all technical instructors at all 11 postsecondary technical institutes in Arkansas who were actively involved in the PBTE program. The instructors included in this study were: (a) Trade -- those teaching welding, electronics, mechanics, automotive service, drafting, air conditioning and refrigeration, industrial maintenance, tool and dye technology, industrial processing and diesel technology; (b) Literacy -- those teaching adult basic education; (c) Business -- those teaching computer information systems, accounting, computer applications, business education, and office technology; (d) Health -- those teaching nursing, medical assisting, surgical technology, and applied health; and (e) Academic -- those teaching math and communications. Instructors who had not participated in the program within the past two years were not surveyed.

Instrumentation

The survey instrument included a complete list of 132 PBTE modules, which included one or more teaching competencies. Using the official records of the University resource person, an individualized survey form was developed for each participant. The modules completed by each instructor were highlighted in yellow on the survey form. Participation in the survey was voluntary and responses were kept confidential. Each instructor was asked to respond only to those modules they had completed. They responded on a five-point Likert type scale ranging from "very helpful", "helpful", "somewhat helpful", "slightly helpful" to "not helpful". Data were analyzed by giving the "very helpful" category a rating of 5 and decreasing to the value of 1 for the rating of "not helpful". In addition, a short demographic section was included which asked for area of instruction, number of years as an instructor, years in the occupation and level of formal education. The instrument was not tested for reliability or validity since it was a complete listing of all teaching modules, which made up the total PBTE program.

FINDINGS

One hundred thirty seven (137) surveys were distributed to technical instructors at 11 technical institutes. Seventy-four (54%) were returned. Twenty-nine of the respondents were trade instructors, 19 were literacy instructors, 6 were business instructors, 5 were health instructors and 11 were academic instructors. Four respondents did not indicate their teaching area. Their years of experience as an instructor ranged from 1 to 23 years, with the average being 6.4 years. The years of occupational experience ranged from 0 to 50 with the average at 11.5 years. None of the respondents has less than a high school diploma. Nineteen had a high school diploma, 11 had an associate degree, 24 had a bachelor's degree, and 16 had a master's degree. One indicated other, and 3 did not indicate a level of formal education.

The mean response for the total group of participants was the highest, at 4.1, for the instructional planning competencies (Category B). This was followed by three categories of competencies with a mean of 4.0. These were: instructional evaluation (Category D); serving learners with special/exceptional needs (Category L); and teaching adults (Category N). The mean score for the total group was 3.8 for all 14-competency categories.

The trade instructors rated the instructional planning competencies (Category B) the highest with a mean of 4.4. The second highest rating for trade instructors was for the instructional evaluation competencies (Category D) with a mean of 4.2. This was followed by the instructional execution competencies (Category C) and the serving learners with special/exceptional needs (Category L) both with a mean of 4.1. The mean responses by the trade instructors for all 14-competency categories were 3.8.

The literacy instructors rated the teaching adults competencies (Category N) the highest with a mean of 4.0. The next highest rated by literacy instructors were the coordination of cooperative education competencies (Category J) with a mean of 3.8. This was followed by the serving learners with special/exceptional needs competencies (Category L) and the assisting students with improving their basic skill competencies (Category M) both with a mean of 3.7. The mean response by the literacy instructors for the total 14 competency categories was 3.3.

The business instructors rated the serving learners with special/exceptional needs competencies (Category L) the highest with a mean of 4.3. This was followed by the implementing competency-based education competencies (Category K) with a mean of 4.2. Next were the instructional evaluation competencies (Category D), assisting students in improving their basic skills (Category M) and the teaching adults competencies (Category N) all with a mean of 3.7. The business instructors rated all 14 competencies categories at 3.6.

The health instructors rated the instructional evaluation competencies (Category D) the highest with a mean of 4.9. Next highest for health instructors were the instructional planning competencies (Category B) with a mean of 4.7. This was followed by the coordination of cooperative education competencies (Category J) with a mean of 4.6. Next were the instructional execution competencies (Category C) with a mean of 4.5. The mean response for the health instructor for all 14-competency categories was 4.5.

The academic instructors rated two competency categories the highest with a mean of 4.4. Those were school-community relations (Category G) and serving learners with special/exceptional needs (Category L). The second highest were the teaching adults competencies (Category N) with a mean of 4.3. This was followed by the instructional planning competencies (Category B) and the guidance competencies (Category G) both with a mean of 4.2. The academic instructors had a mean score of 4.0 for all 14 areas of competency categories.

The results of the analysis of variance performed on the years of teaching experience revealed the following: Academic instructors with 1 to 10 years of teaching experience had a significant higher perception of the program planning, development, and evaluation competencies (Category A) than those with more than 10 years of teaching experience ($p = .0014$). Health instructors with 11 or more years of teaching experience had a significant higher perception of the program planning, development, and evaluation competencies (Category A) than those with less teaching experience ($p = .0000$). Business instructors with more than 15 years of teaching experience had a significant higher perception of the program planning, development, and evaluation competencies (Category A) than those with 1 to 15 years of teaching experience ($p = .000$). There was no significant difference in years of teaching experience and all other categories of modules.

The results of the analysis of variance performed on the years of occupational work experience reveled that trade instructors with 1 to 30 years of occupational work had a significant higher perception of the program planning, development, and evaluation competencies (Category A) than those with over 30 years of work experience ($p = .0210$). There was no significant difference in occupational work experience and all other categories of modules.

The level of education did reveal significance difference between groups. The instructors with an associate degree had a significant higher perception of the program planning, development, and evaluation competencies (Category A) than those with any other level of education ($p = .0424$). There was no significant difference in level of education and all other categories of modules.

The analysis of variance did reveal a significance difference in teaching area ($p < .05$). The health instructors had a significantly higher perception of the usefulness of competencies in seven of the categories (A, B, C, D, E, J, K). The academic instructors had a significantly higher perception of the competencies in three of the categories (G, I, L) than all other participants. The remaining categories (F, H, M, N) revealed no significant differences by teaching areas.

DISCUSSION

There were 4 competency categories, which were consistently rated the highest, at the helpful level. The serving learners with special/exceptional needs competencies (Category L) were rated the highest. Specific competencies in this category consisted of identifying and diagnosing exceptional learners, planning instruction, providing appropriate instructional materials for exceptional learners, modifying learning environment for exceptional learners, using instructional techniques to meet needs of exceptional learners and assessing the progress of exceptional learners. It is quite possible that participants viewed themselves as being prepared to teach traditional students; however, they felt inadequate to teach special/exceptional students. Therefore, they viewed these competencies as being helpful.

A second category consistently rated high was the instructional planning competencies (Category B). Competencies in this area included determining needs and interest of student, developing performance objectives, developing a unit of instruction, developing a lesson plan and selecting instructional materials. It is possible that these groups of competencies were viewed as helpful since they are basic instructional skills, which are needed on a daily basis by instructors.

The next category frequently rated high was the instructional evaluation competencies (Category D). Competencies included were establishing student performance criteria, assessing student performance, determining student grades and evaluation instructional effectiveness. These competencies may have been regarded as helpful since instructors were concerned about grading students in a fair and impartial manner. These competencies help with establishing and conducting student evaluation.

The last category that was rated consistently high was the teaching adults competencies (Category N). This area includes competencies such as determining adult training needs, planning instruction for adults, managing the adult instructional process, and evaluating the performance of adults. These competencies may have been rated high since many instructors felt they needed help with the overall instruction of adults due to their experiences with teaching in pedagogical rather than the andragogical areas.

There were some differences of perceptions of the program planning, development, and evaluation competencies (Category A) regarding teaching experience, years of occupational work experience and level of education. Since the instructors are moving from industry or other levels of education to postsecondary teaching, they may be more responsive to those competencies related to planning an overall program of instruction.

Health instructors had a significantly higher perception of modules related to the instructional process and clinical instruction on the job site than other instructors. None of the health instructors in this study had formal training in teacher education. It can be assumed that this is why they had a higher perception of modules than the other instructors.

Academic instructors had a higher perception of the modules on school/community relations, professional role and development and serving learners with special/exceptional needs than other instructors. The change from a public school setting to a postsecondary setting with adult and community involvement may have attributed to their perceptions in this area.

CONCLUSIONS

Of the 14 competency categories in the Arkansas PBTE program, the instructors found that the areas that contributed the most to their teaching development were instructional planning, instructional evaluation, serving learners with special/exceptional needs and teaching adults. All of these categories were perceived as being helpful.

The results of this study show that instructors found that all the modules were a helpful form of training. This indicates that a competency-based program such as PBTE was accepted by instructors. PBTE offers a self-paced, individualized way to improve the teaching skills of instructors.

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PERCEPTIONS OF PARTICIPANTS IN A MULTI-SITE DISTANCE LEARNING BACHELOR OF SCIENCE DEGREE PROGRAM

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Index: Distance education, multi-site distance learning, distance education bachelor's degree

Abstract: The purpose of this study was to determine student's perceptions of distance education courses taken during a Bachelor of Science degree program designed for adult off-campus students. The following factors were examined:

1. Student learning – self-rated levels of learning and understanding of content.
2. Instructional techniques – instructor's use of lecture, handouts and visuals; instructor's ability to encourage students to participate and reflect.
3. Medium – how the technology affects the pace of the class, the quality of transmission and how different sites interact.
4. Attitude – self-rated feeling about preferences for distance education instruction.
5. Possible uses of distance education – students' view of future uses of distance education.

INTRODUCTION

"Distance education can best be described as the separation of student and instructor during the process of education delivery" (Swift, Wilson, & Wayland, 1997, p. 1). Distance education allows students to be in different geographic locations and receive instruction from the teacher at the same time.

Steiner (1999) identified the defining elements of distance education as "the separation of teacher and learner during at least a majority of each instructional process and the use of educational media to unite teacher and learner and carry course content" (p. 1).

Many distance education programs are designed to meet the needs of the non-traditional adult learner. The proportion of college students who are adult learners has been increasing steadily, with projections of over 50% by the millennium. Fewer than one in six undergraduates fit the traditional stereotype of the American college student – 18-22 years of age, attending college full-time, and living on campus (Griffiths & Gatien, 1999). The majority of distance education students are working adults seeking advanced degrees. Approximately 85% of the adult learners work.

PURPOSE

The purpose of this study was to determine student's perceptions of distance education courses taken during a Bachelor of Science degree program designed for adult off-campus students.

The following factors were examined: Student learning – self-rated levels of learning and understanding of course content; Instructional techniques – instructor's use of lecture, handouts and visuals, instructor's ability to encourage students to participate and reflect; Medium – how the technology affects the pace of the class, the quality of transmission and how different sites interact; Attitude – self-rated feeling about preferences for distance education instruction; and Possible uses of distance education – students' view of future uses of distance education

PROCEDURES

Twenty-seven students who completed eight distance education classes hosted by a major university were selected to participate in this study. The technology provided a voice-activated two-way video/audio transmission. Each site was equipped with a local and a remote monitor. Seven sites were used, and they were all located within the state.

The class size ranged from one student to eight. Questionnaires were mailed to each student who participated in the program. The researcher did not know or have knowledge of any student name, only their assigned number.

Participants. Participants for this study were students enrolled in a bachelor's program for vocational education. Five professors were the primary instructors in the program. Topics of courses covered were: Advanced Strategies in Technical Education, Analysis of Teaching in Technical Education, Curriculum Selection and Selection of Use in Technical Education, Surveying Special Student Populations in Technical Education, Use of Student Resources in Technical Education, Advanced Management in Technical Education Programs, Current Trends and Issues in Technical Education, and Tech Prep in Technical Education. Of the 27 students enrolled in the program, all participated in the study. A total of 27 usable questionnaires were returned for a response rate of 100%. Of the 27 students enrolled, 7 were female and 20 were male. Ages ranged from 25 to over 55 with the majority in the 45-54 age group.

All participants were working full time in technical positions at vocational technical colleges. They taught in such areas as automotive technology, computer technology, culinary arts, diesel technology, electronics technology, machine technology, and nursing.

This program was part of a three-year project funded by the State Department of Higher Education. Participants were required to complete the necessary coursework to obtain a bachelor of science in vocational education. Most students received reimbursement for tuition from the state department of higher education.

INSTRUMENT

A 42-item questionnaire, adapted from Treagust, Waldrip, and Horley (1993), was used to measure attitudes and perceptions of distance education undergraduate students. Permission to use the questionnaire was obtained from David Treagust (personal communication, November 13, 1995). Students were asked to rate their perceptions of student learning, instructional techniques, medium, attitudes, and possible uses of distance education using a five-point Likert scale.

DATA ANALYSIS

The data was analyzed using the SPSS for Windows statistical software package. Mean score and frequency calculations were compiled for the following five factors: student learning, instructional techniques, medium, attitude, and possible use. Variables of interest were: age, gender, size of class, and number of distance education classes completed.

RESEARCH FINDINGS

On a five-point Likert scale, possible uses of distance education was rated the highest followed by medium, attitudes, instructional techniques, and student learning.

Gender. When examining factors by gender, females rated all five factors higher than males. Of the five factors, student learning had the greatest difference between mean scores by males and females, followed by instructional techniques and distance education medium. The least differences were attitudes and possible uses of distance education.

Age. The students ranged from 25 years of age to over 55 years with the majority of students in the 45 – 54 age group. The student over 55 years of age had a slightly more positive attitude than other students.

Size of class. At the seven remote sites, class sizes ranged from 1 to 9 students.

Minimal differences are observed in the mean score for the factors.

Number of distance education classes completed. The more classes completed, the more positive the attitudes of the students were. However, no differences were found in the area of instructional techniques.

The statement "Distance education provides opportunities to do courses that may not be normally available" received the highest rating on the questionnaire with a mean of 4.7. The statement with the lowest mean score (3.3) was "Distance education has had no effect on my learning in the classes."

DISCUSSION

Overall, the perception in all five factors (student learning, instructional techniques, medium, possible uses of distance education and attitude) was positive with possible uses of distance education having the highest mean score. Participants felt positive about distance education after having been involved in the program. Students continued to take additional courses in the program.

Distance education programs are an effective means of communication to offer courses at geographic locations that would not otherwise be possible without the long travel time of instructors and students. Offering courses at a distance provides an opportunity for students in rural areas to take courses from an institution of higher education. It is not surprising that these students would have a positive attitude toward distance education.

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A STUDY OF RELATION BETWEEN ASSESSMENT DIMENSION AND MANAGEMENT OUTCOMES — A SAMPLE OF SINYI REAL-ESTATE COMPANY

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Index: Assessment Dimension; grey relational analysis; Management Outcomes.

Abstract: This study explored the relational grade of Assessment Dimension and Management Outcomes with Grey System Analysis. The candidates were promoted to be a chief of chain store over half years after they had finished the process of assessment center. The results show P&O and A&J dimensions were the most relation with management outcomes. And the quality index is the advance sub-factor of analysis. The different initial value normalization may influent the result of grey relation was discovered in this study. It's valuable to use mean value, max-value, min-value and interval value for normalization in the future study.

INTRODUCTION

The concept of Assessment Center was initiated during World War II (1948). The military of German, England and American developed a tool by the concept of Assessment Center for selecting spies who will work oversea. In 1956, AT&T first used the tool to select supervisors. The validity was very good (Chuang, 1991). Then, Assessment Center was applied in many fields and focused on selecting and training. It also has many studies of validity. The researches of assessment center almost concentrate in the predictive validity of overall assessment rating (Hwang, 1998). There are few researches to study the relation between assessment dimension and the performance of participant.

Lately, Chinese scholar Chi-long Den announced the Grey System Theory in 1982. The theory gave much help in social science research. The research method of Grey System Theory provides the scientific data to clarify abstract system. The ideas of grey relation grade analysis can whiten the grey relation amount every grey system (Den, 1996).

The development and performance of Assessment Center's participant were under the influence of many factors. It is not easy to avoid the criterion contamination (Wu, 1992). Those phenomena are the trait of social system. The relation information between both systems is not clear or exact. It is difficult to describe the relations concretely. We always verify with inference logically or apply the concept of conscious and rule of judgement to conjecture. The process is complicate and much limit. It is waste time and inconvenience for studying. But, the grey system theory provides the chance to clarify relational validity.

THE ORIGIN OF MANAGEMENT ASSESSMENT CENTER

Social organization and effective management are the great achievement of mankind (Kast & Rosenzweig, 1970). The organizational prosperity and decline depend on managers' ability. Long-term performance of enterprise always based on the managers' competence. Progressive technology and science let technical and capital intensive trade face more risk at decision making. Manager's leading behavior and decision-making is the key to business's profit and loss. Unsuitable middle managers make business loss average US$ 250,000 dollars per year from some papers (Chuan, 1991). Therefore, selecting suitable manager is an important thing in the organization.

The speed of organization change is accelerating during modern era. Managers are in the center of the organization's change. They have the responsibility to adhere the change of organization and implement organization's change. Their management competencies affect the development ability of organization deeply. Hence, all of organizations discover the importance of manager development. And it takes much effort on the management development.

A Chinese idiom:" Careful beginning of an activity is better than anything". Let manager practice on the job for learning by doing will take much risk than select a potential and suitable candidate at the beginnings. Over half century, the theory of human selecting was leading by prediction paradigm (Woodruffe, 1993). The methods of selecting have some ideas by experience, and provide some explanation to people's behavior and competency. To predict the future performance of candidates is necessary. Then, assessment center was applied.

BRIEFING OF ASSESSMENT CENTER

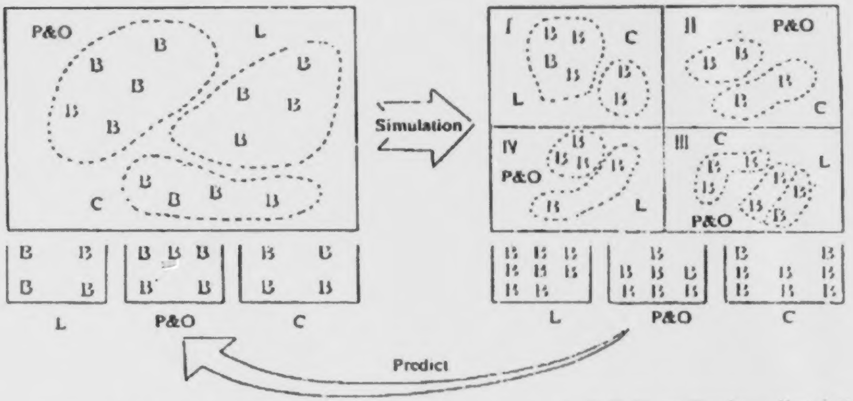
Assessment center concept was initiated during World War II (1948). The military of German, England and American developed a tool for selecting the spy who will work at oversea. 1956, AT&T firstly uses the tool to select supervisors. And the validity was very good. The assessment center method was used in a variety of organizations rapid growth. There are over 5000 assessment centers in USA lately. In addition, Canada, Japan, British, German, Mexico, Holland, and Australia also adopt assessment center method as the tools of evaluating &cultivating manpower. In Taiwan, China Steel Company uses assessment center method to select third level manager firstly. Sinyi Real-estate Company developing the Assessment Center method for selecting chief of chain-store, and had implemented 15 times chief selecting by Assessment Center.

Assessment Center is an evaluated method of standardization. It must analysis the Objective Job for obtaining the needs of abilities and attitudes on the job. Then design or select the exercises or tests for find out the abilities from candidates. During the process, candidates participate in simulation and interview under controlling situation. The assessors must have the experience on Objective Job and participate assessor training. They observe, interview and record the behaviors of candidates. Then integrate and analysis the record data and prepare the assessing reports for reference in promotion, training and settlement (Chuan, 1991; Wu, 1992; Wea, 1995; Lin, 1996; Huang, 1998; Moses & Byham, 1980; Thorntoon & byham, 1982; Woodruffe, 1990; Lau, 1996).

The left Figure 1 is categorized into dimensions with job-related behaviors obtained from a job analysis. The right figure is categorized into dimensions with behaviors. Those perform on the simulation by participants. These dimensions provide a more detailed assessment that is appropriate for judging whether a person is likely to be an effective manager or not. It suppose one has good performance in the simulation situation, will have good performance in the real work (Chuan, 1991).

Every organization or company's situations are different and their applies of Assessment Center are different. But assessment center's basic components are same. There are: A. Participant; B. Assessor; C. Role Player; D. Administrator; E. Simulation Exercise; F. Assessment Dimension.

Fig. I The Basic Principle of Assessment Center



B represents Behaviors or Activities

I, II, III, IV are Simulating Exercises

P&O Planning & organizing
C Communication
L Leadership

IMPLEMENTATION OF ASSESSMENT CENTER IN SINYI COMPANY

Sinyi Real Estate is a chain-store re-house company. Every store spread at every corner of big cities in Taiwan. The chief of store likes a general role at outside area. They manage the members and operate the store. Also, they are the first line manager to contact with customer. Company must delegates the most authority and requires them take responsibility. Therefore, the chief's management ability affects the performance of store and the bottom line of company. The role of chief is very important in the company (Lin, 1996). Sinyi Company set up a Management Assessment and Development Center project (MADC). We process a series work for preparing the MADC. According the function of Assessment Center proof, the current job of candidate and the target job are more different, the validity of assessing is higher than before (Huang, 1998). Then we select the store chief as the Objective Job for MADC.

ASSESSMENT DIMENSION & MANAGEMENT OUTCOMES

Assessment dimensions are different according to the different job and grade. Each assessment center's assessing items of dimension depends on the requirement of Target job. In Sinyi Real-estate Company, to survey the content of management of store chief from the chiefs, managers and subordinates, pick out more important and frequent management items. Then discuss with execute management team and experts to define the assessing dimension as follow: 1. Planning & Organizing (P&O). 2. Analyzing & Judging (A&J). 3.Leadership (L). 4. Decision (D). 5. Managing Control (MC). 6. Communication (C).

According to the results of discussing in the executive management meeting, there are 10 items represent the management outcomes of store chief in the Sinyi Real-estate Company. These can be referred to evaluating. 1. Achievement of the quantity of re-house entrusted (AQE). 2. Achievement of the quantity of dealing house (AQD). 3. Achievement of the quantity of revenue (AQR). 4. Achievement of the quantity of real income

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(AQI). 5. Qualities index (QI). 6. Employee's turnover rates (ETR). 7. The rates of Achievement of the quantity of re-house entrusted (RAQE). 8. The rates of Achievement of the quantity of dealing house (RAQD). 9. The rates of Achievement of the quantity of revenue (RAQR). 10. The rates of Achievement of the quantity of real income (RAQI).

GREY RELATIONAL GRADE AND ADVANCE ANALYSIS

There are many systems influence each other in the real world. And these influences are not easy to clarify. The relation among system, system and sub-system are complicate. Scientists try to solve the relation among systems with every knowledge and mathematics method. Although it is difficult to do, many researches and statistic methods were developed. A Chinese scholar Professor Den had developed grey system theory. The theory can whiten the abstract system. Grey relational grade is one of methods for finding out the relations. (Hong & Lee, 1996, Kur, 1997, Ma, 1997, Cheng & Tsi, 1997)

Grey relational grade analysis measures the relation between factor's trends of development. (Den, 1996) This method is different with other method of factor analysis. The feature of Grey relational analysis as follows: (Hong & Lee, 1996)

A. Statistic analysis requires mass data and canonical spread rule, Grey relational analysis doesn't. It doesn't need so serious.

B. It's simple to calculate, even compare with multiple factors. It isn't so complicate like statistic analysis.

C. Grey system method is comparing the trend shape of geometrical curve. The trend shape are more similar, the relation grade are closer. It doesn't appear strange situation that positive relation be recognized negative relation.

Advance Analysis is used on comparing multivariate series. Mother series (mother factor) is a Reference series, sub-series (Sub-factors) are Compare series. Reference series and Compare series makes relation matrix. Through relation matrix analysis, we can find out, which series is advance factor and others are not. (Den, 1996, Hong & Lee, 1996)

RESULTS AND DISCUSSION

There are fifteen participants who were promoted after they take part in the assessment center. This study isn't including the persons who have not promoted. We use five scales to represent the dimension's level during assessing process. One have the excellent capability in the dimension, we scored with 5; good capability, scored with 4; average capability, scored with 3, below average, scored 2, little capability, scores 1. The new chief's performance data were collected at first half year. The performance data include 10 items of management outcome as follow: AQE, AQD, AQR, AQI, QI, ETR, RAQE, RAQD, RAQR, RAQI.

Assessing dimensions are treated as reference series; management outcomes are treated as compare series. After calculating the relational grades, the grey relational matrix is showed as follow list.

Relational Matrix List							
	P&O	A&J	L	D	MC	C	Total
AQE	**0.8286**	0.6391	0.6695	0.7160	0.7103	0.6993	4.2627
AQD	**0.7773**	0.6709	0.6637	0.7198	0.6839	0.7129	4.2284
AQR	**0.7056**	0.6066	0.6203	0.6699	0.6488	0.6616	3.9129
AQI	**0.6637**	0.5569	0.5579	0.6179	0.6082	0.5876	3.5922
QI	0.7409	**0.9045**	0.8494	0.8602	0.8687	0.8855	5.1093
ETR	0.6975	0.7155	0.7402	**0.7597**	0.6888	0.6979	4.2996
RAQE	0.7179	**0.8718**	0.8274	0.8491	0.8320	0.8489	4.9470
RAQD	0.6645	**0.8730**	0.8272	0.7809	0.7925	0.8058	4.7440
RAQR	0.7290	**0.8934**	0.7995	0.8328	0.8183	0.8397	4.9127
RAQI	0.7230	**0.8850**	0.8145	0.8373	0.8287	0.8321	4.9206
Total	7.2480	7.6168	7.3696	7.6436	7.4801	7.5713	

Analyzing & Judging had the most relational grade with **quality index** (0.9045), and had the least relational grade with AQI (0.5569). **Planning & Organizing** had higher relational grade with **AQE, AQD, AQR and AQI** than others. **Analyzing & Judging** had higher relational grade with **RAQE, RAQD, RAQR and RAQI** than others. **ETR** had the most relational grade with **Decision**, and had the least with management control. AQI had the least grey relational grade with every management outcomes. In the reference series, higher total relational grades are **Decision and A&J.** In the compare series, the highest relational grade is **quality index**.

CONCLUSION AND SUGGESTION

Social system is always complicate and doesn't easy to find out the relation between each factors. Professor Den proposed grey theory for whitening vague social system. From this study, we can identify the relative grade between assessment dimension and management outcomes. Advance analysis clarifies the detail relation amount series.

Management outcomes can be divided three categories. First cluster contain AQE, AQD, AQR, AQI, those focus on quantity of achievement. Second cluster contain RAQE, RAQD, RAQR, RAQI, those focus on rate of achievement. Third cluster is QI and ETR. Making well Planing & organizing will affect the quantity of achievement (Randolph & Blackburn, 1989; Mullins, 1996; Hill & Jones, 1998). This character was proved at this study that first cluster had higher relational with P&O. The rate of achievement depends on setting rational goal. We must make correct analysis and judging of environment, and then rational goal will be set (Pearge II & Robinson Jr., 1991). This character was proved at this study that second cluster had higher relational with A&J. QI needs the competence of gathering, analysis, judging and applying information (Lin, 1999). QI had high relation with A&J and C in this study. It also proves that decision and leadership affected ETR.

The relational between management dimension and management outcomes was proved by this study. The result correspond general cognition of management. There is only one case of company. It is valuable to study other case continuously. To assure the assessment center's validity and reliability with grey theory. By the way, different initial value normalization may influent the result of grey relation was discovered in this study. It's valuable to use mean value, max-value, min-value and interval value for normalization in the future study.

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EXPLORING A NEW PATTERN OF VOCATIONAL EDUCATION AND TRAINING

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Abstract: The 21st century is a new era in which information technology is developing rapidly and the demand from labor force market has broken the traditional concept of education. Vocational education and training as a life education is now regarded as a new type of educational system. But how to help this new system further develop so as to become gradually perfect is a big issue which calls for exploration in our country. We have done a great deal of beneficial exploration in this field and have founded a new Information Technology College by taking the advantage of teaching resources from Northwestern Polytechnical University (NPU), which is one of key universities in China, and the capital from two companies. It is a sub-college of NPU, but it has independent running system. We have gained initial experience in the reform of curriculum development, construction of laboratories and training center, employment of teachers, teaching quality control and evaluation. And we are willing to share them with other participants. Functional words: vocational education and training, teaching resources, teaching quality control, practice training, field school.

As the 21st century becomes a new era in which information technology is developing rapidly, the new development of high-tech, which is changing by each passing day, has broken the traditional concept of education. And vocational education and training as a life education now has developed into a new type of educational system. In "the Project of facing 21st century and vitalizing Education", the State Ministry of Education clearly points out that we should vigorously develop our higher vocational education and training, improve the technological and literature quality of all our civilians and promote employment so as to meet the urgent needs in developing our national economy. It also points out that higher vocational education must face local economic construction and social development, meet the demand of labor market, foster qualified personnel for the first line of production, service and management so as to show its unique characteristics. Therefore, the study and research of the demand in the development of Chinese higher vocational education and exploring diverse patterns of developing this new system becomes a heating topic in our higher educational circle. Based on the State Council's policy of developing higher vocational education and the strategy of developing infrastructure in western China, the school authority of Northwestern Polytechnical University (NPU) decided to found a new college at the beginning of 1999, NPU-GL Information and Technology College, and started enrollment in the same year. The new college is now composed of 6 departments with 10 specialties. From the experience we gained from practice over the past years, we'll explore a new pattern of higher vocational education and discuss some of the issues concerned.

I. THE DEVELOPMENT OF HIGHER VOCATIONAL AND TECHNICAL EDUCATION BECOMES INEVITABLE IN RESPONSE TO THE DEVELOPMENT AND NEEDS OF SOCIETY, ECONOMY, SCIENCE AND TECHNOLOGY, AS WELL AS EDUCATION.

1. To vigorously develop higher vocational and technical education is the demand to develop national economy, science and technology.

Since the 20th century, rapid development of science and technology and economy has led to a great and apparent change in social structure and occupations. This rapid development of high-tech and its wide application in various fields in national economy, as well as the rapid development of service industry, has produced a multitude of new occupations. On the other hand, the original occupations either disappeared or divided into new branches or combined with other forms of occupations. Whatever new occupations are created and whatever vocational positions are divided into or combined with, they require high-tech and relatively higher intelligence, thus increasing the percentage of positional technique and a variety of labor skills. As a result, this new development helps vocational education develop to a new trend of higher level and produces new demand of higher vocational education.

2. **To vigorously develop higher vocational education is the demand for further development of our higher education.**

China's higher education, for a long time, seems to be a one-way system, in which students are trained for a certain discipline of specialty. This one-way system, in which students are trained in a mono-pattern, no longer meets the needs of economic and scientific development because the rapid development of science and technology has brought about short cycle of its application in production. With higher education reform further deepening, the reform of our higher educational structure becomes urgent and inevitable. Higher educational institutions should not only turn out large number of qualified personnel for the development of science and technology, as well as engineering, but also turn out qualified personnel with well-trained technique and skills, who are badly needed in various vocational posts. Meanwhile, higher vocational education opens another new channel for young people to receive higher education, thus constructing "a motorway interchange" and creating a great impact on our entire educational system.

3. **To vigorously develop our higher vocational education is to meet the demand of our social development.**

Over the past two decades, the people's living standard has been significantly improved and the government's policy of "one couple, one child" has been widely accepted both in big cities and countryside. In terms of Chinese traditional culture, parents always expect that their only child can receive better education, hoping he/she will enjoy a better life when growing up. Consequently, after their basic life necessities, such as food, housing, clothing, are satisfied, the Chinese parents try to save as much money as they can for their children's educational expenses. We, therefore, have a large educational consumer market, which is regarded as the largest in the world. It is predicted that in the coming twenty years higher education will become more popular in China, with the people's living standard further improved. As a result, more and more parents hope that their children can receive higher education after their children's completion of high school education. In order to meet this demand of broad masses and to enhance the overall quality of our entire nation, we should explore a great variety of channels of higher education so that the students' individual potentials can be fully developed and students can select their own way of development in accordance with their personality, interest, preference and their strong points. And the teachers can teach them according to their aptitudes.

The connotation of higher vocational education In its "Resolution Concerning the Deepening Reform of Educational System And Promoting Overall Quality Education" issued in 1999, the State Council pointed out that higher vocational education is an important component in our higher education and major effort should be devoted to develop it. It also pointed out that higher vocational education should turn out qualified personnel with necessary theoretical knowledge and stronger practical skills in order to meet the needs in our production, construction, management and service industry both in urban and rural areas. From the above statements, we can clearly see the definition of connotation of higher vocational education. Furthermore, we can understand and analyze its connotation in terms of the four types of qualified personnel needed in human productive and social activities. Based on their functions in social activities, economic operation and development and the development of science and technology, qualified personnel can be classified into four types. The first is academic, who are mainly engaged in discovering rules, creating theories or theoretical and consultant work. The second is engineering, who are mainly devoted to planning, scheming and designing. The third, technical, through whose work, the work of the second type of personnel, such as planning, designing, can be changed into material things or products, causing concrete function to human's social activities. The fourth, skilled, who are mainly engaged in the work of direct operation. We can, therefore, come to the understanding that in terms of hierarchy higher vocational education is part of our higher education and it belongs to the category of higher educational system. In terms of types of qualified personnel, it is vocational and technical education and this education is based on the students' successful completion of their high school education. It trains qualified, advanced and practical personnel for the first line of our production, construction, management and service industry. That is to say, its objective is to train advanced technical and specialized personnel.

Exploring a new pattern of vocational education in NPU-GL Information and Technology College. This college is one of the colleges in NPU, which integrates the advantages of NPU, such as teacher resources, knowledge and technique in aeronautic, space and marine fields, with the capital from Shaanxi GL Printing Limited Company and GL-NPU Software Limited Company. It was founded on the cooperation of three partners and it takes the fundamental task as to train applied, advanced and specialized personnel to meet the needs of social construction. In our vocational education and training, we give priority to the students' applicable ability so as to train qualified and specialized personnel with proper basic theoretical knowledge, stronger applicable technical ability, wide range of knowledge and high overall quality.

1. Specialty arrangement

The principle of our specialty arrangement is to meet the needs of the development of our national economy, especially that of our information industry, and to take the advantages of disciplines and specialties of NPU. In the light of the above principle, the college constitutes six departments with ten specialties. They are as follows: computer, communication & network, electronic trading, information & automatic control, foreign languages and arts. Ten specialties are specified as: computer & its application, English language, communication & network engineering, electronic trading technique & its application, modern trade & business, network finance, public relationship & secretarial service (arts and airhostess training), computer aided design (CAD), automatic control & its application and information system & management.

2. Curriculum development

Our curriculum development focuses on the satisfaction of social needs and the training of ability of learners' specialized technique. So the final goal is to train qualified personnel who can meet the urgent needs in our production line and possess necessary theoretical and specialized knowledge and who can have a better mastery of English language in listening, speaking, reading. These qualified people should be able to operate personal computer work with Internet and have practical skills and technique in their own specific fields. They should also possess the spirit to undertake pioneering work and a better vocational moral standard. And they are cooperative and healthy both physically and psychologically. The corresponding principles of our curriculum development are as follows:

1) Curriculum development should not only be adjusted to the demand of social development, but also to that of socialist market economy and information technology.
2) The relationship among knowledge, ability and overall quality should be properly handled and a good balance among vocational ethics, intelligence, physical health and aesthetics should be well kept.
3) Priority should be given to applicable and practical curriculum. And proper percentage of basic theoretical courses, courses of specialties and field practice should be taken into account.
4) Experts in corresponding industries, enterprises and business should be invited participate in curriculum arrangement, classroom teaching and lab work. And contact should be established with them.
5) We should fully realize the unique characteristics of vocational education and closely combine theory with practice, knowledge with ability training and concentrate on the ability training through all the teaching and learning activities.

3. Construction of the field school

Teaching and learning practice is of great importance in all the teaching activities if vocational education shows its unique characteristics. Practice time in all the specialties is made up of about 40% in all classroom teaching and learning activities. Meanwhile, we strengthen the construction of practice and training center which is located in the training center building which serves as campus network center, TV program broadcasting center, as well as communication center. Installed on the top of this building are the radio communication antenna, TV receiver antenna and radio call station antenna. Inside the building, there are 10 labs (computer, foreign languages, electronic technique, automatic control, communication, network, information, multi-media, multiple purpose and basic theory lab) and one cabled communication center. It also has 6 training school centers (electronic training, designing and manufacturing, computer component installation, software development, scientific and technological making, super market and bank), 2 exhibition rooms (computer development and information technology development), 2 large PC centers used for students' training and practice as well as graduation project.

The new college can take the advantage of association and connection established by NPU with industries, enterprises and companies for scientific research and cooperation in aeronautic, space and marine fields so as to build up its own outside field schools with them. At present, it has field schools in GL-NPU Software Development Limited Company, Xi'an Aircraft Building Company, Chengdu Aircraft Building Company and Northwestern Airline Company etc. Further more, the new college will establish close ties with some scientific research institutions, companies, department stores and banks so as to provide ideal practice and training centers outside school.

4. Construction of teaching staff

In order to ensure teaching and learning quality, both experienced professors, associate professors and experienced engineers, technicians and managers from industries or companies are invited to be instructors for the college. Graduate students working for master or doctor degree are also invited to be tutors. Now the new college has 4 full-time instructors, 32 concurrent, among whom, 11 are professors, 5 associate professors, 2 lecturers, 4 teaching assistants, 8 graduate students for doctor degree and 5 for master. The teacher and student ratio is now 1:13. Our teaching staff will be expanded as the student enrollment increases. On the basis of the characteristics of vocational education, the teacher and student ratio is set as 1:20 with teacher combination of full-time and concurrent instructors, but with the concurrent as the main force, Among the teaching staff, full-time instructors will account for 25% and concurrent for 75%. We will also make a better use of teaching resources from the departments and colleges in NPU. Especially, we will select and invite instructors from scientific research staff and lab technicians so as to take advantage of their strong points. Some best students with better overall quality, who will graduated from this college, will be encouraged to be come teachers here and opportunities will be provided to them for further education if they want to work for further academic degree. Teaching methodology is emphasized and we will try to establish a teaching staff with "two-functions", that is, teachers serve as classroom instructors as well as engineers in the practice and training center. In this way, responsible and efficient teaching staff can be formed.

5. Teaching quality control system

Teaching and learning quality is the lifeline of the college and this quality depends on teacher quality and responsibility, as well as school administration. Thereforé, we have drawn on the experience of NPU and established a set of complete teaching quality control system with the characteristics of higher vocational education. Furthermore, research work will be carried out on the system.

1) Teachers' reward system

On the basis of their contribution, moral standard, vocational capacity, the teachers will be regularly evaluated both by students and school authority. Those who work hard with better teaching effect will receive a reward in the end of the academic year in addition to their regular pay. Those who are not responsible or are not qualified in their teaching work will be fired.

2) Establishment of relatively perfect and strict regulations and rules in teaching quality control

Standard teaching administration plays an important part in the improvement of teaching quality control. So the college has set up and issued several regulation, such as "Students Manual", Teachers Manual" and "Regulations of Teaching, Administration and Service for the Purpose of Fostering Students". Each staff member and student has respective copy so that every work is carried out in accordance with regulations.

3) Regular assessment and evaluation

Mid-term and final term assessment should be regularly carried out at the level of teaching group and departments, in which both students and teachers should participate. Effective measures should be taken if any problems are found in teaching and learning process.

4) Optimizing teaching program

Teaching content should be constantly updated and optimized to keep pace with the development of science and technology, especially that of information technology, as well as the demand of labor market. And qualified personnel from related industries, enterprises and business are invited to participate in the above activities.

6. The establishment of a cooperative system in running the college

The new college has a completely new running system in which the dean is responsible for decision making under the leadership of Board Committee. This system emphasizes the cooperation with industries concerned so that classroom teaching can be closely combined with development of society, production, science and technology so as to absorb new technique and scientific achievement. It has an independent finance accounting from NPU and the service work done by specialized companies in the society.

The founding of this new college has been sponsored and supported by all sides from the society. We have made great achievement, but also run into some difficulties. We'll share our experience with other participants and solve our problems with their help.

TRANSFORMING EDUCATIONAL PRACTICE FOR A TRANSFORMED EMPLOYMENT ENVIRONMENT

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Index: 'Employment-ready' graduates, communication-related skills, discursive learning model

Abstract: Major transformations in the globalised management accounting profession have put pressure on accounting educators to produce 'employment-ready' graduates with a range of communication-related skills. Many past efforts to develop undergraduates' communication skills have been compromised by curriculum designers' reductive approach to 'communication' and the tendency to teach communication skills in isolation from or as an adjunct to the discourse of professional accounting rather than as an already integral element. This paper critiques two models for teaching communication skills within accounting programs, and then presents an alternative, 'discursive' model. It outlines features of this 'discursive model' through reference to a case study.

INTRODUCTION

The ways in which technology and globalisation are transforming the technical and professional workplace are many, various, and complex. In equipping students with the essential knowledge, skills, and attributes to undertake employment in their field, educators must be well-informed about these transformations and update their educational practice to ensure that graduates' skills meet the challenges of a changing workplace. This paper addresses one challenge: the need for more sophisticated communication skills.

TRANSFORMATIONAL TRENDS IN MANAGEMENT ACCOUNTING

In August 1999, the U.S. Institute of Management Accountants published a report, *Counting More, Counting Less: Transformations in the Management Accounting Profession,* which identifies major changes to the role and activities of managerial accountants today. While the report identifies changes specific to the management accounting field, its findings are directly relevant to the general educational task of keeping up with employer requirements within an increasingly competitive global environment.

In a survey of 500 major companies the report found that accountants are spending *more* time on the communication-related tasks of interpretation, analysis, and decision making, and *less* time on the procedural tasks of collecting and compiling information and preparing routine reports. Since there was already a perceived shortfall between employers' requirements and accounting graduates' proficiency in communication (Mathews, Brown, and Jackson, 1990; Bedford, N. et al., 1986), the *Counting More, Counting Less* report reminds accounting educators that if they are to produce 'employment-ready' graduates, they must be more effective in teaching a range of communication-related skills at a more sophisticated level (ASPCA, 1996; AECC, 1990; Macve, 1990).

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Most accounting degree programs do address communication skills, but the way in which these skills are included in the curriculum needs to be updated to equip graduates for employment. The two models most widely used are the **'service'** and the **'integrated'** model. These models do offer some practical benefits, but they are no longer adequate to prepare students for the transformed workplace they will be entering as graduates. To overcome some of these models' inadequacies, a third, **'discursive'** model has been developed.

1. The 'Service' Model

Until the 1980s, schools of accounting tended to rely upon a generic 'service' model for developing undergraduates' communication skills. Typically, 'service' courses were externally taught and administered. Scheduled in accounting undergraduates' first year of study, 'service' courses covered such skills as essay- and report-writing, presentation techniques, and general literacy. In this model, responsibility for students' learning of communication skills was perceived to lie not with accounting lecturers but, on the contrary, with outside communication experts. The communication skills taught in such courses might be applicable to accounting, but they were not intrinsically related to ways of communicating and thinking about accounting.

Even though schools of accounting recognised the importance of communication for their students, they tended to marginalise communication courses offered within the 'service' model as, at best, peripheral to students' accounting education and, at worst, remedial. Certainly, little incentive was offered to accounting educators to become involved in consolidating, reinforcing, or further developing the communication skills that students acquired in the 'service' course. This lack of engagement with communication teaching perhaps helps to explain the results of Rebele's 1985 study, which found that accounting students who were taught communication skills through the 'service' model did not perceive written or oral communication skills to be of major importance to professional success (Rebele, Stout, and Hassell, 1991).

2. The 'Integrated' Model

Throughout the 1980s, accounting educators, especially in the U.S., came to recognise that if accounting students' communication skills were to be improved, they had to be contextualised as integrated professional skills - not as an optional extra or as a remedial exercise but as one of the sets of skills and knowledges essential to the graduate's success as a professional accountant.

Among the more prominent advocates of the integrated model during the 1980s were May and Arevalo at the J.M. Tull School of Accountancy and Hirsch and Collins at South Illinois University at Edwardsville. May and Arevalo (1983) and Hirsch and Collins (1988) both emphasise the importance of integrating writing skills with technical accounting knowledge within a traditional accounting unit, and Hirsch and Collins further advocate applying the model across three sequential units to reinforce learning.

A key element of both these integrated accounting/communication programs is the collaboration between an accounting instructor and an communication instructor: the collaboration involves a fifty-fifty split between the two instructors in their direct input to students. Bringing together accounting and communication in one unit is obviously a great improvement over the 'service' model, but it still presents the relationship between professional knowledge and its articulation through language as two separate discourses: accounting *and* communication. In doing so, it ignores the fact that the cognitive structure and language of accounting *is* accounting no less than accounting facts, figures, and practices; the communication of accounting is *not* identical with the communication of other professional disciplines (Agger, 1991).

This last point merits further elaboration. It begins with the notion that accounting, like all professional disciplines, is a *discourse,* and here the word 'discourse' is used in the sense that Michel Foucault explains in *The Archaeology of Knowledge* (1974) and subsequent studies. 'Discourse' is a notoriously difficult term to define simply and precisely, but, drawing on the insights of Mikhail Bakhtin as well as Foucault, Roger Fowler (1990, p.54) offers a useful definition. Fowler writes that discourse is

> speech or writing seen from the point of view of the beliefs, values and categories which it embodies; these beliefs ... constitute a way of looking at the world, an organisation or representation of experience….

When we speak of accounting as constituting a discourse, therefore, we are referring not only to its technical and conceptual 'content' but also to the language which articulates and embodies this 'content'; indeed, there can be no content without the language of words and numbers through which it is conceived, thought about, and communicated.

In presenting accounting and communication as complementary discourses, the integrated model bifurcates the accounting discourse, creating a false dichotomy. There are, as both May and Arevalo and Hirsch and Collins explain, sound practical reasons for the accounting class to have direct instruction from the communication expert, but the presence of this expert inevitably supports the false impression that the means of articulating the accounting discourse lies *outside* the discourse in the complementary but no less discrete discourse of communication studies (Dawson, 1996).

3. The 'Discursive' Model

In contrast to the 'service' and 'integrated' models, the 'discursive' model recognises communication to be inseparable from the accounting discourse. The model was developed as part of an action research project in a second-year undergraduate managerial accounting unit in the Curtin School of Accounting. The aim of the project was to integrate students' learning of communication skills - in particular, their oral presentation skills - with their learning of contemporary management accounting concepts and strategies. The project was facilitated through collaboration between a communication specialist and the subject coordinator, with the support of three lecturers in the subject.

Having observed the shortcomings of the 'integrated' model, the project facilitators kept the focus of the unit clearly and unequivocally on managerial accounting; it was essential that the presentation skills component of the unit should neither disrupt students' learning of managerial accounting concepts nor be perceived as a discrete 'add on'. It was agreed that the presentation skills that students acquired during the unit were not an end in themselves but, rather, a means of articulating, sharing, and monitoring what they were learning about managerial accounting concepts. The approach taken was informed, in part, by insights from the Langer and Applebee (1987) study of the ways in which students *learn through writing* (as opposed to *learning to write*).

The communication specialist's role was to provide teaching and assessment resources for the managerial accounting lecturers and to discuss implementation strategies with them; there was no direct contact with students in the unit.

The project facilitators' decision to address presentation processes rather than the writing processes discussed by Zinsser (1988) and McLeod and Soren (1992) was arrived at in discussing the learning objectives of the unit. The subject coordinator and the three lecturers were given a self-assessed Teaching Goals Inventory (Angelo and Cross, 1993), and asked to identify instructional goals they believed to be 'essential' - that is, goals they tried to achieve 76% to 100% of the time. In responding, they were asked to think about these instructional goals primarily in terms of equipping their students for the 'real life' world of professional employment. The result of the TGIs was a consensus on the importance of the following four goals:

- developing students' ability to synthesise and integrate information and ideas;
- improving students' listening, reading, and speaking skills;
- facilitating students' learning of the subject's concepts, theories, perspectives, and values; and
- developing students' ability to work productively with others.

GROUP PRESENTATIONS

From this result, the project facilitators decided that group oral presentations of a series of academic journal articles would be an appropriate focus for these particular teaching goals. Students were required to read five journal articles and to submit well-structured summaries of three of these for part of the presentation assignment grade. They then had to choose one of the journal articles they had read and/or summarised and share the salient points with the rest of the class in a formal presentation.

The communication specialist provided the lecturers with instructional material, newspaper reports and short articles discussing the importance of presentation and oral reporting skills for the business professional, some 5-minute exercises to help students practise their delivery technique, additional 'tips and hints', and sample holistic marking guides for lecturers and for peer assessment.

One of the immediate objectives of the project was to ensure that each group's presentation was a quality learning experience for the whole class - and not just the presenting group. In outlining what was required in the group presentation assignment, the project facilitators explained that the principal objective of the assignment was to *disseminate to their colleagues* information that the group had gathered, processed, and evaluated. It was stressed that the success of the presentation depended not on the amount of detail that was included, nor on superficial aspects of delivery, but, rather, on the integrity of the processed material and the effectiveness of its transfer to the audience. Students were encouraged to focus not only on the audience's need for information but also on their capacity *as listeners* to receive and assimilate this information.

The instructional material given to students emphasised the importance of structure to a successful presentation in terms of guiding the audience logically and methodically through the material being presented. Because of this emphasis on structure, students were made more aware of how the journal articles to be presented were themselves structured: how they used headings and subheadings, paragraph transitions, and linguistic markers to organise their topic. Students' increased awareness of structure was reflected in the summaries they submitted, suggesting that the lecturers' emphasis on structure had positively influenced the way students read the articles. As well as noting individual points being made, these summaries showed some evidence that students had both identified patterns and connections between points and had an appreciation of the article as a well-organised whole. This suggests that students were adopting a 'deep' learning style (Biggs, 1987), the basis of life-long learning.

Moreover, through their practice of reading, summarising, and presenting managerial accounting concepts in a clear, coherent, and logical way, students were not simply learning *about* professional discourse; they were also actively participating in it. Open-ended feedback indicated that, as in earlier surveys, students found the task of reading and summarising the journal articles somewhat arduous, but there was a greater awareness of the relevance of the task to professional practice.

GRADING AND PEER FEEDBACK

At the beginning of the project, the accounting lecturers expressed some concern about grading presentations and giving useful corrective feedback. While they were confident in their ability to evaluate the 'content' of presentations, they felt they lacked the expertise to comment on specific aspects of the form and delivery of this 'content'. This problem was addressed by training the lecturers in the use of a **holistic grading** scheme. In this form of grading, key areas (content, structure, and delivery) are identified but not given separate grades; grades are allocated according to where the assignment fits into a descriptive continuum (Dawson, 1998): 'excellent (8+/10), 'very good' (7/10), 'good' (6/10), 'satisfactory' (5/10), 'poor' (4/10), and very poor' (3/10). With practice, lecturers gained confidence in their own judgement and reported that students believed they were fairly graded.

Because the success of professional presentations in the workplace must ultimately be measured by the effectiveness with which they disseminate useful information to an audience, the class was asked to fill in an evaluative feedback sheet for the presenting group. This feedback sheet was passed directly from the audience to the presenters; the audience was not asked to assign a grade but only to make constructive criticism. In asking the audience to respond in this way, the project facilitators once more underscored for students the fact that in professional practice presentations are not simply demonstrations of the accountant's knowledge and expertise; they are also essentially about re-processing and re-articulating accounting information for a specific audience.

CONCLUSION

The discursive approach briefly outlined here is more than just another method of delivering instruction on communication-related skills to accounting students. In fact, it represents a shift *away from* the notion that accounting is about a static and isolated set of facts, knowledge, and procedures *towards* an understanding that accounting is a dynamic discursive practice (Bailey and Benz, 1991). Such an understanding is essential to the success of every graduate entering the transformed - and constantly transforming - employment environment of today and tomorrow.

Acknowledgement: Thanks to Mr Bob Carson, who co-facilitated the 'discursive' model project described in this paper.

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PRE-AND POST-ASSESSMENT IN OCCUPATINAL COURSES

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Index: Competency approaches, assessment, standards

Abstract: In the United States, demonstration of a vocational education teacher's ability to teach academics (reading, writing, math, etc.) is essential in many states. Vocational teachers need to show students' learning gains within their content areas along with how they contribute to the teaching of academics. This session will present how to use a pre-post test system to document academic and content learning gains. Examples of academic skill documentation and teacher-made pre-post assessments will be shared.

INTRODUCTION

Assessment is a part of a student's or teacher's every day life. In the United States, state departments of education are developing tests to determine academic levels of their students based on state-developed standards. This charge was in response to the U.S. Secretary of Education's call for higher education standards for all students as well as parents, legislators, and the general public wanting schools to be accountable for students' learning. The hoped for end result is that with U.S. students meeting higher standards, they will be able to successfully compete within global educational and work environments.

Data indicates problems with the current system of education in providing a base level of academic skill suitable for success in the U.S. workplace. According to the National Institute for Literacy (NIFL) (2000), American businesses are estimated to lose over $60 billion in productivity each year due to employees' lack of basic skills. Of the American companies polled by the NIFL, 47% reported that their workers lacked basic math skills and that 71% reported that basic written communication training was critical to meeting their workplaces' skill demands.

With the increasing focus on academics, students have started to complete fewer vocational or occupational education credits at the high school or secondary level. According to statistical information summarized from U.S. Department of Education's Vocational Education in the United States: Toward the Year 2000 , from 1982 to 1994, high school students completed fewer vocational credits (down to 4.0 in 1994 versus 4.7 in 1982) and the number of students completing a concentration of vocational courses in an occupational area had also declined ("Statistical Abstract," 2000). As to academic preparedness of vocational students, the study found that in 1994 only 33% of vocational students completed the basic core academic standards in high school (four years of English and three years each of math, science and social studies.) The preliminary data indicates that in 1998 approximately 45% of vocational students were meeting these standards. Even though the percentage of vocational students completing basic academic requirements seems to be increasing, all vocational students need to demonstrate basic reading, writing, math, and science (as necessary) competencies.

An important fallout of the increasing emphasis on academics is the narrowing of the curriculum, i.e. elimination of courses that don't contribute to a student's academic competence. This reaction could be particular potent in smaller schools with limited resources. To maintain vocational courses and programs in high schools, teachers need to demonstrate how they contribute to students' academic skill development as well as their vocational competence through appropriate assessments.

ASSESSMENT

Assessment is defined as "a process of collecting data for the purpose of making decisions about individuals and groups" (Salvia and Ysseldyke, 1998, p.5). Assessment instruments range from standardized tests to classroom tests. The instrument used is only part of assessment process. When students are assessed, teachers and educational institutions consider the way students perform a variety of tasks in a variety of settings or contexts, the meaning of their performance in terms of the total functioning of the individual student, and the likely explanations for those performances. When students are assessed, their competence is being measured.

The focus of this paper is the need to access academics and vocational content in the context of the vocational classroom or in the workplace. Considerations in the construction of possible teacher-made assessments to demonstrate meeting academic and vocational content standards will be highlighted.

ASSESSMENT CONSIDERATIONS

In the U.S. Vocational Education Performance Standards and Assessment Techniques report (McCaslin and Headley, 1994), high school proficiency exams were the commonly used technique for assessing basic academics while portfolios and program completion were used more frequently to assess advanced academics. About two-thirds of the states at the secondary level used something other than nationally developed techniques for assessing academic skills. Work skill attainment was assessed by locally selected or developed techniques at both the secondary and post-secondary levels.

Most academic assessments utilize an objective-analytic approach. With this approach, teachers systematically assess the key components of performance and the key elements within each component. For example, a teacher requires that a student develop a resume. The key components and elements the teacher might look for could include the following:

1. Gather information on work experience, education, and awards.
    a. List places where worked, supervisor's name, dates of employment, job title, and duties
    b. List education experiences including special courses of study, majors, and graduation dates.
    c. List awards and honors received.
2. Use appropriate layout and grammatical rules for resume.
    a. Resume format uses bold, indents and fonts in a consistent manner.
    b. Resume includes the categories of personal information (name, address, phone number), education, work experience, and awards.
    c. Resume content is organized in an effective, understandable manner.
    d. Resume uses phrases versus complete sentences.
    e. Resume is one page long.
    f. All material is spelled correctly.

g. The resume is typed.

After identifying the key elements in the task, the teacher can then develop objective scoring standards to assess student performance. Scoring is based on observable performance or products with criteria that applies to all students. Students (and the teacher) will then know what mistakes have been made and how to improve performance.

Often teacher-made tests are not held in high regard. However, teacher-made tests can be better suited to evaluate student achievement than commercially prepared norm-referenced tests. A teacher-made test can match the curriculum being taught and be sensitive to individual student differences. Teachers who are concerned with pupil mastery of specific concepts and skills are in a position to test a narrow range of competencies directly and frequently through teacher-made tests. A teacher's test is the key to understanding the teacher's curricular intentions.

For a teacher-made test to be useful as an assessment, the assessment must "standardized." For a teacher-made test to be standardized, tests should use consistent directions, criteria for scoring, and procedures. Competencies and outcomes need to be clearly specified along with what level of performance is acceptable.

Tests also need to be reliable and valid. For a test to be reliable, the test should consistently measure whatever it is suppose to measure from administration to administration. To aid reliability, precise scoring guides should be used. Validity looks at whether the test is measuring what it is suppose to measure. The most important type of validity for a teacher to consider is content validity. A test has content validity if the test measures the specified competencies and provides scores that tell whether the student has mastered the competencies or not.

To help teacher-made tests meet these characteristics, Salvia and Ysseldyke (1998) suggest the following:

(1) the test covers on specific, important content information,

(2) the questions asked are relevant to the content,

(3) the way that the questions are asked are familiar to the student,

(4) questions are sequenced in a logical manner, i.e. easiest to hardest or by competency,

(5) test items are group by similar types (multiple choice, short answer, demonstration, etc.),

(6) directions are clearly written,

(7) systematic procedures are development for scoring responses, and

(8) criteria are established to interpret student performance, i.e. weighting of questions and assigning of mastery levels.

WHY CONDUCT PRE- AND POST-ASSESSMENT IN VOCATIONAL CLASSES

Assessment of the academics in vocational classes is imperative. Historically many students have shunned vocational courses and programs because of the perception that they will not prepare them for admission to four-year colleges and universities. Today vocational programs tie vocational classes and work experience to non-vocational subjects, including math, English, science and social sciences (Stern and Rahn, 1995).

Literacy of workers is an important issue for businesses. Students need to understand the information presented in text and graphic format similar to those found in the workplace. They need writing skills to report observations and data collected, complete forms, and write memos and reports. Conducting pre- and post-tests allows teachers to show learning gains within their content areas along with how they contribute to the teaching of academics.

PRE-TESTS

A pre-test is a snapshot. A pre-test will provide information about what students know and don't know. With that knowledge, a teacher can develop appropriate learning strategies. According to Camp (2000), several small pre-tests that are specific to a content area are better that standardized tests in aiding teacher's teaching. By practicing assessment in the classroom, teachers will better able to understand and promote learning and increase their ability to help students to become effective, self-assessing students (Angelo and Cross, 1993).

The pre-test and post-test should be equivalent. That is they should cover the same objectives, use the same test directions, cues, and testing formats. Pre- and post-testing of content to determine learning gains can both be formative in nature. An additional summative evaluation of content via a performance or authentic assessment as a portfolio or completed project can be used at the end of a unit with pre- and post-tests being used through the unit instruction.

The pre-test should be evaluated on its reflection of the competencies to be tested, scorability, and feasibility. The pre-test that is difficult to grade (either by type of questions or type of assessment as a performance-based assessment with a class of 30) or takes too long to complete is not useful to the teacher. The pre-test sets the stage for the documentation of learning gains in content and academic areas.

THE PROCESS OF ASSESSMENT FOR LEARNING GAINS

The first step in documenting academic skill growth is to identify the academic skill requirements for your state or country and look at how these skills can be documented. Possible assessment strategies include observation (as with oral presentation skills) and teacher-made tests (to assess writing, math, and reading comprehension skills). Of course, performance or authentic assessments as portfolios, product-based learning, and demonstrations can be used but may be too time consuming to be used as formative evaluation in a pre-test. However these assessment strategies are appropriate for summative evaluation.

In the state of Colorado, three levels of standards exist: (1) academics, (2) general occupational skills (SCANS skills), and (3) specific occupational skills. Students can be pre- and post-tested on any appropriate subset of these standards every week. Pre-tests will inform teachers on what to teach and provide the benchmark for learning gains.

Effective pre- and post-test procedures need to be established. A suggested procedure to be followed is:

(1) identify the standards/competencies that you wish to pre-post test,

(2) develop an instrument that allows one to determine the student's level of skill or competence,

(3) establish an effective administration procedure,

(4) analyze the results, looking for gains and areas of low mastery, and

(5) report the results in an understandable manner.

SUMMARY

By using pre- and post-tests to document learning gains in academics along with gains in vocational content areas, vocational teachers show how they contribute to students' learning of academic subjects and support the general education mission at the secondary level. This documentation should help build a case of maintaining vocational courses at the secondary level and thereby prevent the narrowing of the high school curriculum. The documentation of academic skills will also indicate to businesses how the schools are meeting basic skills through vocational programs.

Note: Session participants will receive examples of pre-post procedures for one week and teacher-made pre- and post-assessments in various academic areas.

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TRANSFORMING YOUNG SCHOOL LEAVERS AND MATURE UNEMPLOYED INTO SKILLED IT WORKERS – THE IT ASSISTANT TRAINING IN HONG KONG

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Index: Employability, IT Skills Training, IT Assistant

Abstract : This paper attempts to review the "IT Assistant Training Program (ITAT)" in bridging the gap between IT manpower need and the employability of young school leavers and mature unemployed in Hong Kong. It will inspect ITAT in a detailed manner in the aspects of planning, collaborations, curriculum development, administration, pedagogical considerations and job placement. The effectiveness of the program, in terms of job fulfillment and added value of IT knowledge, will also be discussed. To conclude the paper, the value of continuity and the possibilities of evolution of the program will be highlighted.

THE GAP

In recent years, a gap, which is growing wider and wider, is observed between the supply and demand of IT manpower in Hong Kong.

In the information era, the supply of IT manpower is of paramount importance for Hong Kong to turn into a knowledge-based and high technology society. The recent boom of E-commerce further poses serious demand in the manpower with Web/Internet know-how. Although such need in IT manpower had been prevailing for quite a number of years as reflected by the bi-annual IT Manpower Survey conducted by the Vocational Training Council (VTC), the recent situation can be both distinguished in terms of the number and the spectrum of shortage. According to the recent report submitted by the PriceWaterHouseCoopers for the "Manpower and Training Needs of The Information Technology Sector" which was commenced by the Education and Manpower Bureau (EMB) of the Hong Kong Special Administration Region (HKSAR), it is predicted that there will be around 17,000 and 56,000 (high-end estimates) sub-degree level manpower shortfall in the coming 5 and 10 years, respectively. At the same time, as we are marching into the Internet/Web era, with the penetration of IT into every aspect of life, the varieties of IT jobs had been diversified greatly into job opportunities across various education levels, with many of them are suitable for secondary school leavers who are not successful in pursuing further studies. This is well different from the need of mainly degree graduates IT professionals in the past.

So this is just one side of the gap - the demand side.

The availability of the IT jobs is just one side of the story. The labour market in Hong Kong is now facing a very critical challenge. Many of the workers with skills in traditional industries lose their jobs when Hong Kong is turning its economy from industry-based to finance and service-based in the past years. The problem is even more severe for young school leavers. According to government statistics, more than 20,000 participants in the Hong Kong Certificate of Education Examination (HKCEE) got the result of failure in all attempted subjects. Also, about 25 to 30% of these young school leavers are unemployed.

So this is another side of the gap - the supply side.

Ironically, it is apparently that there exists a mis-match between the IT manpower shortage and the supply of abundant manpower of young school leavers.

BRIDGING THE GAP WITH SPECIAL FOCUSED TRAINING – IT ASSISTANT TRAINING PROGRAM (ITAT)

In order to bridge the apparent gap for betterment of the society, the EMB of HKSAR initiated a 10-week full time IT training for F.3 to F.5 school leavers and unemployed mature people. If we believe academic results are not the only yard-stick in measuring the capabilities of people, ITAT will help in bringing some concrete paths for those who have aptitudes in IT. The pilot phase runs from Feb to July 2000 with 300 trainee places. The course contents cover topics in Office Applications, Basic Web Development, E-commerce Operations, Multimedia Production, Internet Support, Networking and Soft Skills. The graduates are suitable for assistant level jobs in IT like IT Assistant, Internet Support, Junior Technician and Web Assistant. The course is basically free. Trainees have to pay a deposit of $1,000 which is refundable upon 90% attendance and pass in the overall assessment.

THE STEERING COMMITTEE

The ultimate purpose of ITAT is bridging the gap as mentioned. To make the program tackle right, a steering committee with EMB officials, program implementers (VTC and ERB) and industry representatives was formed. Several meetings were held in 4th quarter of 1999 and after further consultation with more industry representatives, the course structure (Appendix I) was formulated in Jan 2000. IT Training & Development Centre of VTC (ITTDC/VTC), with bunch of experience in IT Training since 1986, was designated as the Program Manager of the whole program responsible for major course development, quality assurance, train the trainers, admission, administration and implementation. The steering committee continues working in course review and placement monitoring. In retrospect, this triangle formed with government, employers and training providers is a good system for optimization of the planning and monitoring of the whole program.

APPLICATION AND ADMISSION

The announcement of ITAT in Dec 1999 resulted in overwhelming response. Over 3200 applications were received. This reinforces again the belief of IT prominence in Hong Kong. The first batch of trainee places is 300. In order to select the right candidates, and also in line with common practice in IT courses, aptitude tests were conducted in Feb 2000. The applicants with satisfactory test marks were invited for subsequent interviews. Each board of interviewers consists of a representative from the industry and another one from the training providers. Major aim of the interview is to find out the attitude, maturity and the commitment of the trainees. This is very important in view of ITAT is placement-tie. At last, 300 applicants were selected and allocated to various classes from Feb to Jul 2000. The classes were formed with best homogeneity in education level and age to lead to best pedagogical effect.

COURSE DESIGN, ADAPTATION AND TRAINER CONSIDERATIONS

Course contents were adapted specially for ITAT. The technicality and concepts were specially tuned to suit for the education level of F.3 to F.5. A team of over 10 training officers of ITTDC/VTC was deployed for the course development. Outside parties (e.g. YWCA, CityU Consultancy Ltd, independent consultants) were responsible for development for some of the topics like Soft Skills, Preparation for IT and Multimedia topics. About 50% of the time is dedicated for practices and laboratory exercises. Intensive training sessions were arranged for the trainers. Selection of trainers is based on technical knowledge and most importantly, the teaching experience and skills. After all, ITAT is not a very technical course and the successful conveyance of the contents/skills to the trainees in the limited time of 10-week intensive training is of most important concern. The course is designed to be conducted in Cantonese, but with handout and software mainly in English. It is considered that IT works involve heavily the familiarity with English in the technical terms, manuals and working environment. We would like the trainees to "feel comfortable", though may be not very competent, in English so as to help them to fit in the working culture of IT. As a supportive measure, more abundant time in lessons was planned for discussion on English terms and a glossary with Chinese translation was prepared for some of the commonly used IT terms.

THE RUNNING OF ITAT

As expected, the running of ITAT faces hurdles to be overcome.

Intensity is one of the major hurdles. Learning rhythm for secondary students is seldom like ITAT - 9 to 5 for Mondays to Fridays and half day for Saturdays. The trainees may get difficulties in settlement of knowledge and reinforcement of skills. It was observed that they need some time to adapt to such mode of intensive training. After several weeks, the situation becomes better especially when the course reaches some longer, practical oriented modules like Basic Web Authoring. In view of the situation, tutorial sessions on every Tuesday and Thursday evening were added. Such sessions provide a more relaxed environment for the trainees to review the contents of the modules and foster a more amicable relationship between trainers and trainees.

Language is another barrier. In fact, the trainees paid their efforts in finding out the explanations for various English terms. The whole trend resembles the issue of intensity very much - it is observed that the trainees are more adapted, though still feeling very challenged, towards the middle of the course. They agreed that English orientation can help them fitting in IT jobs, but at the same time it's tough for them to cope with.

Difference in learning paces. With classes of over 20 trainees and various education level and age groups, it is inevitable that there is variance in learning paces within a class or among classes. Constant feedback from trainees' evaluation forms for each module, observation and appropriate follow-up by trainers, review meetings held with trainers are ways for the modulation and optimization.

Overall speaking, the running of such pilot program should be put in a very dynamic context for instant adjustment and rectification. The role of Project Manager is thus of paramount importance in such context.

ASSESSMENT

The assessment is 2 fold. Every Saturday, there is a multiple choice based test to assess the basic but practical knowledge of the trainees. A review session will be held before the test. It is useful for the recapitulation of the contents of the modules especially in such intensive training for trainees of F.3 to F.5 education level. At the end of the course, there is a final practical test of 2 hours. Trainees have to produce a "not so complex" Web site within the time limit using techniques in HTML, Web Authoring Tool and some resource files in animation and images. It is quite a challenge for them as some integration technique has to be employed in the time-limited test. Most of the trainees are very serious in preparation for this final assessment. They are willing to stay behind after lessons to join the tutorial sessions for revisions.

JOB PLACEMENT

The first 3 classes of 66 trainees finished at early May 2000. Among them, 60 were successful to graduate. Another about 119 trainees graduated (among 124) throughout May and early June 2000. The final batch of 110 graduated in Mid July 2000. The placement rate up till now is over 50%.

The placement process is the ultimate verification of the program. It is believed that the market can accommodate junior IT workers, or workers who know basic useful IT knowledge in computer applications, Web/Internet skills good for a modern office environment. It is observed that such market need really exists. The only question is how big is the market and the growing rate of it ? Some more concrete survey data may help in more understanding on this aspect.

In view of the importance of placement, there is a 3-day Soft Skill module covering topics in human communications, job seeking and communication skills. Such techniques are introduced, practiced and reinforced through vivid case study, role-play and games. In terms of support and facilitation, 3 Placement Officers were employed to assist the trainees in job seeking. Well before the graduation, information of ITAT was sent out to potential employers through chambers of commerce, various associations and by reference to databases. Counseling and job matching was also carried out. All graduates get a free email account and a login for ITAT Internet based forum for receiving job information and experience sharing.

The graduates entered the market in many job positions : Internet Support Officer, IT Assistant, Junior Technician, Clerk (IT knowledge needed), Web Designer, Web Assistant, Network Engineer Trainee, etc. The salary ranges from HK$5,000 to $12,000. Much of the knowledge in ITAT can serve as the foundation knowledge in their jobs. For instance, concepts/terms in Internet networking helps in the work of Internet Support Officer and Web Authoring knowledge will help in Web Designing jobs. When we met with the graduates (they came back quite frequently for job applications and chatting), we always encouraged them that stepping into the IT field needs some dedicated effort - the knowledge learnt in ITAT is just a beginning for stepping in, and constant upgrade through lifelong learning is the right attitude to take.

There are quite a lot of exciting and encouraging cases. Ah Lai was one of the trainees of F.3 education level. He had some working experience in Real Estates Agency and sales before joining ITAT. His commitment and learning attitude in the course was well appreciated by the trainers. Immediately after graduation, Ah Lai was employed by a telecommunication company in Internet Support with monthly salary over $10,000. Originally the job needs qualification of F.5 minimum, preferably F.6 or higher. It was Ah Lai's effort and the market need which make the case come true. When I met Ah Lai and talked about networking, broadband and TCP/IP, his fluency in such topics gained through a week of internal training impressed me very much. Getting the right attitude, Ah Lai will become a real Internet Support professional in not a very long time.

We plan to issue questionnaires to the graduates after they graduated for half a year to see how they are going on with their endeavours. The summary of such on-going survey will give more reflections for considering future direction.

THE DIRECTION

The government has secured the fund for 1000 more trainee-places per year for 2000/01 and 2001/02. The course structure was renovated to have an assessment of incremental on-going project in Web site development for better integration of skills learnt. Some more tools and streams were added like Hardware Support Stream. More Chinese translation of terms is also incorporated.

To benefit more people, some of the modules were (and will be) transformed to Web-based mode. This anytime, anywhere and self-paced mode can lead to more participation in the program. However, care must be taken to ensure the effectiveness of the new mode of learning, including adequate face-to-face seminar/tutorial support, warm-up sessions for adaptation to Web-based self-learning mode, suitable motivation and ample practical sessions. Relevant tests needed to be developed for formal and standardized assessment of the participants. The timely establishment of the IT Skills Assessment Centre serves such purpose.

The whole meaning of the program still lies in the need of the market. Relative to the training side, the employers of the industry and owners of the SMEs are expected to be more aware, as time goes time and with more appealing awareness programs available, of the importance of IT in their business and start their steps in trying to employ some IT Assistants in their office.

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DISCUSSION AND DESIGN OF HIGH VOCATIONAL EDUCATION

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Key words: Work, discussion, design

Abstract: To set up a vocational technical college within a university is in accordance with the tendency of international high education. It is an important and practical move to develop high vocational education based on China's realities. Although there is much controversy on decision-making and difficulties in operation, in a sense and in a particular period of time, promoting the all-round development of vocational education can not be underestimated. To greatly and timely promote this cause is one of the Key points in the developments of China's 21st century vocational education.

I. INTRODUCTION

1. Major Adjustments in the Structure of China's Higher Education from 1998-1999

The dual features of high vocational education, talent mode and education scale are the major subjects of how education adapts to economy, social development, esp regional economic development, strengthen comprehensive national power, raise the qualities of laborers, forming a diversified integrated educational structure.

2. Position and Task of High Vocational Technical College in Universities

It is the banner and symbol of educational quality and diploma credit, therefore is an integral part of high vocational educational system: a special arm in promoting quality education and deepening teaching reform. Its function can't be replaced.

3. Vocational Technical College of Zhengzhou University, Past and Present

The college was set up in 1989. It was originally called vocational education centre, mainly engaged in short term vocational training and self study exam guidance. In 1998 it turned to high vocational education. In 1999, it recruited 374 students in 5 specialities in the province.The ratio of registration and admission is 13:1 for liberal arts and 5:1 for science. In December 1999, it changed to Vocational Technical College, a second-rate independent college according to the requirement of State Educational Department.

4. The Statistical Data of Specialities and Students in the University and College

Our school was founded in 1956 and is the only "211 project" school of the Province at present. It occupies an area of more than 1,600 mu. The total area is $350,000m^2$. It possesses more than 164 million copies of books, 10 libraries and three laboratories. There are now 8 departments, 43 specialities, 10781 students and 1080 professional teachers. It plans to recruit 4196 students in the year 2000 (3800 undergraduate students, 396 vocational students) Vocational Technical College is one of the seventeenth departments of our university. It has a teaching building of $2553m^2$ integrating teaching and training.

II.WORK RETROSPECT

In accordance with the principle of taking reform of educational ideas as the forerunner, educational reform as the core, education facilities construction as the base and management as the impetus, trying to form its own special feature.

1.Change of Concept and the Training of Management Personnel

High vocational education in the modern sense has a history of more than 100 years in China. It had many ups and downs. The reason for this is that the educational theories and ideas are adversely affected by traditional educational ideas and foreign modes. Therefore a new idea on talent, occupation, teaching quality, curriculum, teachers, education management should be formed.

*** Information Exchange**

Increase the subscription of more than ten kinds of newspapers and periodicals on vocational education, actively symposiums, carrying out inter-school communications.

*** Discussion of Teaching Methods**

Teachers and staff members routinely hold discussions on the topic of high vocational education, such as the features of vocational education, basic requirements for training and practice, key courses construction, teaching materials construction, management, service and ideological work etc.

*** Expert guide**

Invite experts, leaders to give academic reports

*** Investigation and research**

Conduct investigations to **Shanghai** and Shenzhen

*** Training of Management Personnel**

Carrying out 2 terms of computer management training

*** Adjustment of Management Organizations**

Establish and strengthen training and management department, job guidance department

2.Specialty Setting up and Courses System

*** The Initiation and Work of the three-in-one Specialized Guiding Committee**

It is formed by relevant persons in charge of the industries, enterprise personnel, educational specialists. Main functions stipulated in the <regulations>: making educational plans and supervise its implementation, forecasting vocational education development and setting requirements of capability qualities, taking part in the selection of teachers, guiding its training, helping in the verification of job qualification certificates and providing consultancy.

*** Investigation of Social Professions and Forecasting of Industry Development**

*** Preliminary Attempt at Experimental Unit of the Integration of Production, Research and University**

Through self-raising capitals and loans, set up 3-4 multi-functional laboratories integrating design manufacture and practice.

*** Teaching Plans and Curriculum Design**

Teaching plans of each specialities are consisted are consisted of study period, work ranges, relevant qualification certificates, job capabilities, course type (key courses, vocational technical courses, vocational practical training, etc.), time proportions and implementation details

3. Infrastructure Construction for Training and Study

After ten years of development, the college has possessed basic teaching facilities. In order to open up new prospect of high vocational education and repay society for its trust. It has invested more than 60 thousand in the first half of 1999 and plans to loan 30 million in the construction of infrastructure facilities including:

*** Set up Practical Training Department and Training (Experiment) Centre (3-5 Multi-functional Imitation Training Laboratories)**

*** Promote Multi-media Teaching and Build for Distance Computer Education Facilities**

Meanwhile, give full play to the resource advantage of universities; investigate the resource-sharing mechanism between universities and colleges, between universities and enterprises:

*** Resource-sharing mechanism of the experiment teaching within university**

*** Training base network outside university, including form the inter-university complimentary relationship of teachers, experiments and training between the strong and the weak**

*** Cooperate with government and enterprises in employment guidance**

*** Self-study coach for those on the job and out of school**

*** Short-term Vocational Training Jointly Conducted with, or Entrusted by Government Institutions and Enterprises.**

4.Tasks of Teaching and Learning

*** System of Teacher's Qualification Evaluation, Training and Appointment**

Openly recruit teachers from the university or society. Before start teaching, teachers should study <The Principled suggestions to the Formulation of Teaching plans in high Vocational Education > and relevant documents, drafting teaching plans (including experiment and training plans).

*** Relevant Documents Management**

Experiment report, methods of management of status as a student, teacher's files, etc.

*** Quality Evaluation and Supervision**

Draft <Courses and Teachers Evaluation and Investigation Form>, encourage students to give marks to courses and teachers, routinely conduct examinations about teacher's ideologies and teaching levels, carrying out teaching and research activities.

*** Selection and Compilation of Textbooks:**

Basically using the high vocational textbooks recommended by the Educational Department, other teaching materials will be evaluated by experts.

- **Varied and Colorful Community Activities of the Students:**
  - Emphasize the Education of Political Ideology and Professional Ethics
  - Lay strers on the construction of cultural and scientific facilities, setting up teacher's reference room and student's reading room, preliminarily putting in 2000 to subscribe more than 10 kinds of specialized periodicals and books, setting up a fixed fund to encourage scientific competition activities.
  - Compulsory Labor
  - Scientific, human and English lecture
  - Cultivation of creativity and work capability
  - Part-time work and Part-time study, subsidies for poor students

5. Problem for Discussion

Quality and unique feature is the life line of vocational education. At present these still exist the following dilemmas and problems:

- Covert and extrovert conflict between ideology category facing high vocational education and structural category
- The backwardness of vocational investigation and the lack of guidance in employment prospect forecast and job-hunting
- The proper role of government and enterprises
- The customary practice of mono vocational ethics (moral) education and education reform
- Entrance qualifications and the dilemma of/the "flyover" conception
- The lack of relevant credentials. The application of the qualification certificates of comprehensive and overlapping specialities such as accountant computer calculation, construction supervision and the certifications for English grade test.
- Endless controversies of the teacher's teaching habit and quality standard, subject standard and capability standard
- Discussion of English, Chinese, computer and business lessons
- Development of new curriculum
- Confinable study
- Development of teaching and management manpower resources
- Students' insurance in the training
- Teaching quality appraisal system
- Buildings, equipment and capital

6. Design For The Year 2000-2002

*** Tasks and Environment Analysis:**

Economy, credit; the estimation of the phenomena of "escalation" of diploma by employing units under society, government and university, including Henan's economic development forecast; analysis of the mechanism of mainly relying on tuition and supplemented by government subsidies; society's recognition of diploma population and employment pressure; analysis of government education, personnel, labor policies; research on the adjustment and reform measures of university; analysis of the needs of parents and students

*** Set up 7-8 Key Specialities, the Scheduled Number of Students Will be 1200-1300**

- * The selection and initiation of 1-2 high and new technology-intensive and job-elastic choice specialities, determine the development strategies of the specialities and the foundation of the"flyover" according to investigation of labor market
- * The experiment unit of integrating production, teaching, training and research-managing capital, solving the problem of lack of understanding between universities and enterprises, planning to set up comprehensive multi-functional training certre
- * Realizing the systematic planning of experiment and training, highlighting the feature of vocational education
- * Set up 15-20 stable practical training bases
- * Establishment of long distance educational network, enlarge inter-collegiate communication and information exchange
- * Enlarge capital investment on buildings and equipment through multi-channel efforts
- * Set up a teaching team consisted of full time and part-time teachers
- * Reform of management mode and system, improve the system of appointing, training teachers as well as the tutorial, evaluation and personnel check-up system, explore the ways of elective course and the credit system
- * Reform of the existing curriculum and reorganization of the curriculum system as well as curriculum appraisal-explore the content and modes of quality education, continuable education, conducting research on the lessons of Marxism's-theories, DengXiaoPing's theories, physical training, culture and arts, labor for public good, vocational ethics (moral) lesson as well as selective curriculum of arts and science covert curriculum.
- * "Elevate" 1-2 four-year schooling high vocational undergraduate specialities, making academic and talent preparations for the application of master's degree station.
- * Strengthen teaching and scientific research, accomplish 2-3 large and medium-sized academic tasks entrusted by the government or by cooperating with enterprises, trying to get research funds
- * Gradually compile textbooks of the college itself, actively taking part in the national, provincial and municipal compilation of teaching materials
- * Explore students' activities of mass organization mainly for skills competition and management service activities centering on labor insurance.
- * To appeal for the establishment of a provincial and regional labor market analysis system and a community technical training certre
- *Conduct multi-level before job, after job vocational training and self study exam guidance

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TEACHING STATISTICAL PROBLEM SOLVING IN VOCATIONAL EDUCATION

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Index: Vocational education, problem solving and statistical practitioner.

Abstract: As our society is moving towards information economy, vocational education programs should equip students with the skill able to search, use and analyse information. Although the rapid and continuous development of information technology can ease the computational burden of data analysis, statistical analysis of data is not a simple task that acquires statistical practitioners having specific knowledge and skills to deal with statistical problems.

Education of statistical practitioners is specifically concerned with preparation for improving performance in applications of statistics in industries such as finance, manufacturing, etc.. This advocates learning problem solving skills which require practice in thinking about, implementing and evaluating solutions to statistical problems. In this paper, the author wants to discuss the roles of vocational education in education and society; and to explore how to educate statistical practitioners to solve statistical problems in real-life projects.

INTRODUCTION

Many jobs today require labour with formal training and preparation for initial job entry. One of the fundamental purposes of vocational education is to provide each student with competent skills for employment. These skills should meet the needs of the local labour market and the competency standards accepted by industry (Hall, 1991).

Improving problem solving performance at work is an important aim for vocational education. Thus, the vocational curriculum focuses on a practical approach rather than a theoretical approach. Their learning activities usually include tutorials, laboratory and workshop practice sessions in addition to lectures. The students learn how to use tools and practical techniques to perform tasks; and how to solve problems in work environment effectively (Nasta, 1994).

As our society is moving towards information economy, information literacy becomes an essential skill mandatory of today's work as well as living. Hence, vocational education programs should equip students with the skill able to search, use and analyse information. Although the rapid and continuous development of information technology can ease the computational burden of data analysis, simply using information technology as an analytic tool without genuine statistical understanding of data may lead to inaccurate results and/or invalid conclusions. As a matter of fact, analysis of massive amounts of data is not a simple task that acquires statistical practitioners having specific knowledge and skills to deal with statistical problems.

Statistical practitioners provide statistical support and services to various government departments as well as industries such as, finance, manufacturing and so on. For instance, they can provide financial analysts with expected returns and statistical measures of variability of returns in their investment portfolios. Education of statistical practitioners is specifically concerned with preparation for problem solving performance at statistical works. They are encouraged to play an active role of learning rather than the role of passive recipients of teaching. This advocates learning problem solving skills which require practice in thinking about, implementing and evaluating solutions to statistical problems. In this paper, the author wants to discuss the roles of vocational education in education and society; and to explore how to educate statistical practitioners to solve statistical problems in real-life projects.

THE ROLE OF VOCATIONAL EDUCATION IN EDUCATION

The primary purposes of vocational education are pre-employment training, retraining for new or different jobs or upgrading the skills of a workforce. Each person can have access to advance to his or her highest potential consistent with his or her ability, interest and desire and the needs of society.

A vocational education college needs to promote links and liaison between vocational education and the employers in industry. The co-operation between the college and the employers should be maintained in a well-informed level. If the employers want their future employees with certain specific skills in order to cope with job requirements in our technological society, there should be a channel to communicate with the college. Thus, the college can ensure that training or future education program meets the needs of the local labour market (Hall, 1991).

Vocational educational helps students develop attitudes about the personal, social, psychological and economic significance of work. They are taught attitudes conducive to workplace discipline. They should be made aware of their roles in the world of work. They learn how to relate to characteristics of economic activity with their careers or jobs. Curriculum planning for vocational education can be based on the nature of society (Olson, 1973).

The education process should involve the students actively rather than allocating them the role of passive recipients of teaching. Learning should be directly relevant to the active interests and concern which students will face in their out-of-school life. This implies a progressive increase in student control and autonomy.

The vocational curriculum usually has an emphasis on a practical approach and includes laboratory work and workshop practice. The students learn to use tools and practical techniques to perform tasks in a field of occupations. Vocational curriculum is planned to recognize the fact that skills and related technical knowledge vary in content and depth for each job requirement. Therefore, all students after completing their vocational education are able to work effectively (Nasta, 1994).

THE ROLE OF VOCATIONAL EDUCATION IN SOCIETY

Our technological society expects that everyone can have the opportunity to earn and enjoy a good living. For instance, people enjoy advanced technologies in communication such as, mobile telephone, facsimile machine, personal computer, satellite television and so on. In our technological society, vocational education are able to:- improve and promote economic, social and intellectual growth; make contribution to a nation's asset; promote career awareness and prepare youth for employment (Shoemaker, 1971).

Secondary school output has in recent years grown much faster than employment opportunity. Government, therefore, needs to handle the problems of slow growth and youth unemployment. Theoretically speaking, the problems can be remedied by vocational education because it serves to adjust the rate of youth unemployment in labour market. Lower rate of youth unemployment will be found if more youth are engaged in full-time vocational education. Hence, vocational education programs are designed to prepare youth for an entry-level occupation (Organisation for Economic Co-operation & Development, 1983).

As the society with more people with higher skill levels, human resources become the product of vocational education. It is to provide practical help to employers wishing to improve their training efforts; deliver and develop training system in local industry. This improves competencies and abilities of employees. In this way, employers can improve their productivity and the quality of products they manufacture. As a consequence, this may improve their enterprise. Thus, vocational education makes contribution to a company's asset as well as a nation's asset in general.

STATISTICAL PROBLEM SOLVING

Many vocational education programs aim at teaching students how to solve problems in workplace. This is a practical and efficient learning approach when the students are placed in a problem situation (Gagne. 1985). Problem solving is another form of learning because students have also learned something new after completing their problem solving tasks (Tolman, 1959). It requires the students to discover the higher-order rule with minimum assistance.

Education of statistical practitioners in vocational education level is specifically concerned with preparation for improving performance in applications of statistics in industries such as finance, manufacturing, etc.. Thus, a statistics curriculum should be built around problem solving skills so that statistics learners will be more easily to transfer their skills from learning environment to work environment. Practice in solving statistical problems is helpful in producing competent statistical practitioners because such practice is able to:- enhance the learning process; reinforce statistical concepts and techniques; provide an environment of construction participation; and improve statistical thinking and reasoning. Helping students master the problem solving skills is an instructional objective.

Problem solving involves a set of events in which students use previously learned rules to achieve a goal. The acquisition of previously learned rules is essential but not sufficient (Francis, 1990). Problem solving requires intellectual skills, organised verbal information and cognitive strategies. Intellectual skills refer to the rules, principles, and concepts that are required for operations. Organised verbal information helps problem solvers understand the problem and carry out a validation of the answer. Cognitive strategies enable the student to select appropriate information and skills and to decide when and how to apply them in attempting to solve the problem (Gagne, 1985).

To discuss the statistical problem solving process, the following example based on the topic of regression analysis is presented. Regression Analysis is one common technique employed to solve statistical problems. Its concepts were taught in lecture session and computer laboratory sessions gave students hand-on practice experience. On completion of this topic, students were expected to build up a regression model that could be used for prediction. Without solving problems on their own, they were unable to have an overview of statistical problem solving process. Therefore, their teacher (i.e., the author of this paper) asked each of his students to do a mini research project that was data-driven and problem-oriented. Each project was completed on individual basis under their teacher's supervision. In this way, each student took more active role in his or her own learning and was less reliant on his or her teacher. Each student was required to:- 1) propose his or her own project title; 2) identify the aim of the project; 3) set the research objectives; 4) collect the relevant data; 5) analyse the data by using the regression technique; 6) do statistical computations by using SAS (Statistical Analysis System) software; and 7) submit a written report on his or her own research findings.

Students would be active to participate in topics that interest them when they could identify their own topics. For example, one student could propose "Analysis of Electricity Consumption in Hong Kong" as the topic. Each of their project titles was required their teacher's approval in order to avoid duplication of project title and/or work.

In attempting to solve a problem, problem understanding is prerequisite because crucial to successful problem solving is the organised verbal information employed to translate verbal statements into specific directions for statistical operations (Francis, 1990). This guides a problem solver to construct his or her own representation of the problem so as to achieve the goal of the problem. So that, students had to put down a problem statement that outlined the aim of the problem. They should also clearly state the objectives of their project to be achieved.

Although the problem statement and the objectives provided clues associated with previously learned rules and strategic planning of problem finding, students could hardly complete their problem solving tasks in their projects, without having some guidelines of model building. For this reason, the strategy for building a regression model given by Neter et al. (1996) was discussed in lecture and computer practice sessions. The strategy requires regression modellers to:- 1) compile data; 2) check four assumptions: correct functional form, homoscedasticity, independence and normality; 3) check multicollinearity; 4) detect outlying and influential observations; 5) build a tentative model based on five model selection criteria and three model selection procedures; and 6) check model validity.

For manageable workload for collection and processing of data, each of the students had to compile a set of real data containing one dependent variable, five independent variables and eighty observations. They were asked to collect real data because the context of real data kept them actively participated in the statistical problem solving process (Cobb, 1987). In order to keep their eyes focused on problem solving tasks, they could use the data compiled and released by Census and Statistics Department of Hong Kong Special Administrative Region. Students were required to prepare and submit their own data set together with a report describing the data context to their teacher. He then checked whether or not the nature of data was consistent with context of the topic. If consistent, an approval was granted. Selection of relevant data required students' cognitive strategies to justify whether or not the data could be used to achieve the stated objectives.

Before a regression model was built, students had to check four assumptions and the existence of multicollinearity, outlying and influential observations. What students acquired were intellectual skills to check all these. They basically carried out statistical tests to determine whether any of the four assumptions was violated or not; multicollinearity existed or not; and outlying observations or influential observations were detected or not. If any of the statistical tests failed, remedial work should be done. How the remedial work to be done was an important issue. For instance, the linearity assumption was violated, how the data to be transformed was a key question. To answer this question, the employment of a cognitive strategy was to guide student's thinking in finding which parts of the data did not achieve linearity; whether a specific form or pattern of data was recognised; and what form or pattern of the data appeared to be. All of these suggested what data transformation the students should try. Successful data transformation relied on cognitive strategy of a problem solver as well as the nature of data.

To save tedious and laborious computations in data analysis, students made use of SAS software to build the best regression model. Forward Selection, Backward Elimination and Stepwise Regression were the three rule-based model selection procedures. The acquired intellectual skills were to justify the significance levels of entry and removal. Then, SAS would take care of the rest of the procedures and came up with a final regression model. These three procedures were not necessarily to provide the best model but they could serve as screening procedures especially for a large set of data. Using five model selection criteria: $\overline{R}^2$; s^2 ; the length of the prediction interval; C statistic; and PRESS acquired students to possess intellectual skills and cognitive strategies to build the best regression model. Although selection of the best model relying on each individual criterion was stated, strictly using these criteria might come up with many probable models. Consequently, no regression model was built. For the situation like this, students should study how each of the selection criteria might affect the importance of an independent variable. They should employ their cognitive strategies to justify the practicality and the usefulness of the model when the model was built on their own. This also took parameter estimation and parsimony into consideration. They should keep their eyes and minds open to the computer output as the modelling process is dynamic. Through model building, they could eventually develop critical thinking and evaluative skills that would allow them to have success in the workplace.

For successful problem solving, the problem solver must find ways of checking or validating the answer (Gagne, 1985). This procedure is important because problem solvers should assure correct answer. Similarly, model validation is a mandatory part of the model building process (Neter et al., 1996). So that, the students should check up on the model in the sense of plausibility and usability of the regression model. In carrying out model validation, organised verbal information enabled students to perform residual analysis for overall model fitting.

The whole process of problem solving was incomplete not until writing a report. Writing statistical report is one of the job duties of a statistical practitioner so as to communicate analytical results to non-technical audience in a clear and concise manner. In addition, report writing is able to focus on the internalisation and conceptualisation of subject material; encourage creativity; and enhance the ability of communication (Radke-Sharpe, 1991). The students therefore were required to submit their reports because report writing was a part of statistical training.

CONCLUSION

Improving problem solving performance at statistical works is essential in an information age because analysis of massive amounts of data acquires statistical practitioners having specific knowledge and skills to deal with statistical problems. Teachers of statistics must differentiate problem solving from the routine statistical computations. That is, students should not be taught only to use previously learned rules carrying out routine tasks to solve problems but also knowledge and strategies in problem solving. This requires students competence in intellectual skills, organised verbal information and cognitive strategies.

Genuine statistical problem solving takes into account and deals with problem understanding; the translations of problem settings into statistical operations; evaluation/validation of the results; and dissemination of the results. The learning of problem solving best occurs when students are assigned to solve their own problems. They are more interested in completing their projects when the projects are arising out of application to real-life problems. The teacher's task is to organise appropriate problem solving situations and to ensure the scope of problem is within his students' capabilities. The students should maintain strategies effective in solving a problem. Their teacher acts a supervisor to assist students in clarifying and then confirming or disconfirming their working steps.

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STRUCTURE AND CULTIVATION OF THE KNOWLEDGE AND ABILITIES OF STUDENTS OF HIGHER VOCATIONAL TECHNICAL EDUCATION

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Index: Higher vocational education, Knowledge, Ability, Cultivation

Abstract: This paper puts forward the constitution module for the knowledge and ability structure that students of higher vocational education should have. It sets forth at the full some basic principles that the basic knowledge the students of higher vocational education should master ought to be limited to no more than enough for their future use while their special skills and knowledge should be advanced, practical and their humane knowledge should be rich and extensive. It also suggests certain measures for the cultivation of their comprehensive practical abilities and the dialectical relationship between knowledge and ability which leads to the conclusion that equal stress should be put on both of them.

A. An Account of Our Raising the Question

With the development of national economy and society, the wide application of high and new technology, the rapid development of the third industry, and the breaking-up and compounding of the original vocational posts, a lot of hi-tech-related vocational posts have been created, the technical content and intelligence level of which are becoming higher and higher, as a result of which society has raised even higher requirements of those to be employed in both their knowledge and abilities. In such a case, the technical talent from secondary vocational schools is no longer able to meet the requirements and qualified for the posts. On the other hand, the talent cultivated by institutions of higher learning, which have long been pursuing the subject-centred cultivation module, is neither able to adapt himself to the front-line requirements of production, construction, service and management. As a result, great efforts must be made to develop the higher vocational education so as to turn out various talent able to meet the requirements at different levels. The higher vocational education in our country started its life in 1985, and the Vocational Education Law formally went into effect in September 1996, since which time the higher vocational education has established its legal place. The three-reforms-and-one-compensation policy suggested by the National Education Ministry to boom the higher vocational education began to be tried in more than 20 provinces and municipalities in 1998, when 110,000 students were enrolled.

And universities and colleges of undergraduate course in our country also began launch pilot projects in higher vocational education from 1999. As far as the speciality offering, teaching plan making, coursebook selecting, and the practice of teaching plans are concerned, however, they are all still in the experimental phase of being studied, practised , reformed and established. Up to now, a perfect cultivation module has not yet been formed.

In order to adapt to the requirements of the knowledge-economic age and the information society, the present paper of ours suggests a constitution module for the knowledge structure of the students of higher vocational education, and some cultivating approaches and measures to intensify the cultivation of their creative and practical abilities, so as to promote the rapid development of science and technology and economic construction in our country.

B. The composition of the Knowledge-and-Ability Structure of Students of Higher Vocational Education

Knowledge is a general term which is used to refer to the understanding and experiences of man gained in the practice of his transforming the objective world, and which has been organized and classified into various subjects, while the ability refers to man's comprehensive application of his knowledge, which is the subjective conditions enabling man to be equal to his work. The study of the science of talent has proven that knowledge is the basis of one's ability, while one's ability is the representation of his knowledge. Only when one has a good and systematic command of much knowledge, can he develop and heighten his ability. On the contrary, without knowledge, the cultivation of one's ability would come to nothing. Therefore, to develop one's ability, he must first acquire sufficient knowledge. On the other hand, however the accumulation of one's knowledge does not necessarily mean the natural improvement of one's ability, that is, one's knowledge is not equal to his ability. Just as the old saying goes, pedants may gain high scores but show low abilities. Thus, school education should aim at not only teaching students much knowledge but also leading and driving students to turn their knowledge into abilities in the course of learning their knowledge, which are of even greater importance. And the improvement of their abilities will, in turn, provide the necessary conditions to facilitate their acquiring new knowledge and expanding their knowledge range. From the above-mentioned, it is not difficult to see that knowledge and ability are inseparably interconnected and complementary to each other, and can reinforce each other. They are different from each other but related to each other. Neither of them can replace the other. Thus it can be concluded that higher vocational education in our country should be geared to the needs of the modernization construction, the world and the future, based on which the necessary basic knowledge to be taught to the students should be limited to no more than is required while their special skills and knowledge should be advanced and practical and their humane knowledge should be rich and extensive, all of which make up the basic principles for the cultivation of the technical application abilities of the students of higher vocational education, upon which, the design of the students' quality structure in knowledge and ability, and their cultivation plans should be based. In our opinion, the students of higher vocational education should be equipped with four kinds of knowledge and six abilities.

The four kinds of knowledge should include: 1. factual knowledge which tells people "what it is"; 2. principle knowledge which tells people "why"; 3. skill knowledge which tells people "how" such as techniques, skills, methods and keys; and 4. manpower knowledge which tells about who will be involved and whom to cooperate with, and which actually refers to the knowledge and ability of administration.

The five abilities refer to 1. the creative ability; 2. the thinking ability which means the ability to turn out new ideas, to find out and solve problems and to think about and analyse problems according to various symbols and images; 3. the ability to acquire and make use of knowledge and information; 4. the ability to make rational use of and dominate various resources such as time, expenses, equipment, manpower, etc. 5. the ability to properly deal with interpersonal relationships, which will enable them to efficiently cooperate with others, and work together with people of different backgrounds; and 6. the ability to learn all one's life.

C. Reorganizing the Teaching and Learning Structure and Optimizing the Teaching Plan

Teaching plans are blueprints for the cultivation of students, which have to focus their attention on the requirements of the development of social economy and the developing trend of the specific pecial fields, and which will enable the students to occupy a proper position in the labour market with their stored knowledge and learned skills. Owing to that, the relationship between basic theory and professional knowledge has to be properly dealt with when the course structure is reorganized. Greater stress should be put on the proper orientation for the cultivation of talent and his application abilities. What's more, the students should also be equipped with proper sustainable developing abilities, fine vocational morality and devotion spirit.

When forming the course framework for higher vocational education, we must try our best to stick to the right orientation, emphasize practice, show the comprehensive features and gear it to the future.

(1) We must firmly stick to the socialist orientation. When teaching the "two courses", we must put greater stress on combining theory with practice so as to improve their practicality and efficiency. A good job must be done of the political and ideological education and the specialized education must be combined with the ideological education. In the course of specialized education, a good job must also be done of their specialized spiritual and moral education.

(2) Great stress must be put on practice. The practice time for each speciality at school must be normalized. It must be ensured that half of their three-year studies at school must be spent on practice, experimentation, social investigations etc. , which will be arranged for them by school. In the meantime, the course practice scope must also be expanded, with part of the teaching content of the basic courses for specialized courses taught in the lab, and part of it taught at the site so as to intensify their perceptual knowledge and help them form a positive professional orientation. As far English teaching is concerned, the training of their listening and oral expression abilities must be strengthened. As for their computer knowledge and application competence, they will be required to pass the national computer grade tests.

(3) All the courses must be synthesized. Because the higher vocational education aims chiefly at the cultivation of the technical application talent, the synthesization of different courses are of even greater importance. The synthesization should be performed at two levels: one is reflected in the specialized courses, which means establishing the specialized course module centering around special skills. In the specialized module, most of the courses will be short-period ones, with the long-period courses strictly limited, the timely tests made of the efficiency of the courses being taught and the training requirements in the specialized module made clear, so as to achieve the interacting effects of the skill training and knowledge teaching. The other is reflected in the common courses, which means establishing the course module centering around quality education and intensifying both ideological and specialized education, both of which aim at combining humane education with science education, theory teaching with practice teaching, and basic education with advanced education.

(4) Put into practice the policy of the "three orientations" ,and develop the students' quality in an all-round way. At present, special stress should be put on the improvement of the students' future-oriented quality. To realize this objective, we must pay attention to three respects: the first one is to strengthen their study of foreign languages by combining foreign languages learning with their vocational requirements, with great stress placed on the cultivation of their foreign language application ability related to their future work; the second one is to intensify the teaching of basic computer knowledge. In the future society, no members, if they don't know how to operate and use computers and develop computer software, can bear important responsibilities for social

development; the third one is to expand the psychological teaching content. The pressure brought about by competition in the future society will be a new problem man has to face, in which case the adaptability of the students to society and their life must be strengthened. The teaching module for the three-year vocational education in our institute is shown below:

The proportion between theory teaching and practice teaching will be 1:0.8. Among the theory teaching part, the two-course education module will take up 9.4%; foreign languages teaching module 12.2%; physical culture module 4.9%;cultural quality module 4.2%; computer module 6.6%; natural sciences module 10.7%; basic courses module for specialized courses 27.56%; specialized courses module 24.6%. With practice teaching, basic experiment module will take up 8%;specialized basic experiment module 14.5%; specialized experiment module 18.5%;the concentrated practice links 59%.

The operation of the teaching plans for higher vocational education has its own characteristics, owing to which three synchronizations must be stuck to in the course of making course plans. Firstly, the adjustment of the course plan must be synchronized with the deepening of people's ideological understanding. Secondly, the adjustment of the course plan must be synchronized with the deepening of teaching reform. And thirdly, the adjustment of the teaching plan must be synchronized with the improvement of teachers' qualities.

D. Strengthening the Cultivation of Their Practical Abilities

The most important feature of higher vocational education lies in the cultivation of students' better practical abilities. However, how can we turn out talent with both comparatively better practical abilities and outstanding knowledge-creating abilities to meet the requirements called for by the knowledge-economic times? We think the study and reform of the following links should be emphasized and intensified.

1. Turning verification into application in the course of practice teaching

With the cultivation objective of higher vocational education taken into account, we should ,when leading students in doing experiments, turn verifying experiments into application experiments according to the specific characteristics of the students, which means the students should be made not only to skillfully master the methods and skills of a certain experiment but also to know what else the experiment can do and how to make use of it. In this way, the students' view will be widened, their creative inspiration will be activated, and their knowledge-creating sense and creative thinking will be developed. For example, in the viscosity experiment of lubricating oil when the verifying method was adopted as the experimental method, students used to be asked to verify the result through experiments after they had been given the standard oil and informed of its viscosity value. However, if we reform the experimental method by changing the standard oil into used oil, and asking the students to find out the viscosity value of the used oil for themselves in the same experimental conditions, to determine the quality of the lubricating oil according to the change of its viscosity values, and further to decide whether the lubricating oil can be used any longer, what will the students learn from the experiment? From it, they will actually know how to gain accurate and reliable data for their use and management of oil for mechanical equipment according to their own analysis of its physical and chemical targets. This kind of experiment can also enable them to analyse the causes of the lowering in the quality of the oil, and find out the specific spots which cause the lowering so as to provide a scientific basis for the trouble -shooting and maintenance of machines.

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2. Turning visiting into exchanging in the cognitive practice

The cognitive practice is an important and integral part of practice teaching links, which aims at making the students realize the objective world through the reflection of their brain on the objective world, and which belongs to the perceptual stage of cognition. This stage aims at involving the students in their vocational fields as early as possible so as to strengthen their interest in learning their specialized courses and awaken their knowledge-seeking desire, which will surely help them change from passive receiving of knowledge to active gaining of knowledge.

Generally speaking, the process of the cognitive practice used to be nothing but a superficial-understanding-gaining visiting process. To change this situation, the guidance teacher has to go to society, make wide investigations and work out scientific and rational practice outlines when selecting practice units. Detailed plans should be carefully made to invite technical leaders and experts to give reports on special topics, who will introduce to the students their important work posts and the making links of their typical workpieces. During the reports, the students and their masters should be give sufficient time to discuss and exchange their ideas so as to make the students able to know the all-round requirements of the key posts on the talent in knowledge, skills and quality. Thus, the ability of the students to find out and gain knowledge in practice will be actively developed.

3. Turning the passiveness into mutual compensation in production practice

The production practice will be performed in this way: students will play the main role, their masters will work as the main guides and their teacher will serve as the bridge between the students and their masters. The masters are rich in practical experience and operation skills but short of theoretical knowledge and lateral exchange of information, in which case some of their key processes or methods may be out of date. However, on the contrary, their weak points may be just the strong points of their students and the new processes, methods and techniques needed by their key technology might be the ones the teacher is good at. If a good job is done of the coordination by the teacher in a rational way, the effect of mutual benefit may be gained. Let's take for example the production practice in machinery repairs. When fixing the cylinder jacket of the internal combustion engine the masters usually still use the traditional fixing method, which means that they will first put wooden blocks under the end of the air cylinder and then strike with a hammer. This kind of traditional fixing method will result in poor fixing quality, owing to which the method was dropped off long ago from the new modern internal combustion engine repair processes and replaced by a new fixing process, in which the surface of the cylinder jacket will be coated with machine oil after the water-proof ring is fixed, and then it will be pushed in place manually. The new fixing process can ensure good fixing quality and also save much time and labour.

4. Changing from one certificate to more certificates in the certification system. Our higher vocational education will put into practice the multi-certificate system, which means the students will be required to take part in various vocational skill tests and appraisals according to the various vocational skill norms specified by the labour or social security sectors concerned, about which we have made clear and detailed specifications in our teaching plans, and as a result of which the students will be able to get their corresponding vocational qualifications certificates as well as schooling certificates at their graduation.

All the courses and teaching content will be normalized according to the national unified vocational skill standards and the vocational skill appriaising specifications. Both teaching and learning will be organized according to the requirements respectively related to basic skills, specialized skills and relevant skills. The students will be required to have a good command of at least a foreign language and the operation of computers and other modern office equipment, and to be equipped with their corresponding vocational abilities so as to lay a fine foundation for their successfully gaining their "employment passes". To realize this objective, we have actively created the necessary conditions for them, by which we mean that our institute has already had a vocational skill appraisal institute, one of the national computer grade test points and a driver training centre established in our institute, our applications for all of which have already been approved by the Provincial Labor and Social Security Departments and the Test Centre of the National Education Ministry. Now, we have been authorized to test and appraise the vocational skills for 8 posts such as engineering survey, architectural decoration, and computer grade tests, as a result of which part of our students will be able to get their driving licenses and other certificates at their graduation, which will surely facilitate their employment after their graduation.

Practice teaching is the life-line of the higher vocational education and the key to the cultivation of students' comprehensive abilities and qualities. Facing the challenge of the knowledge economy of the 21st century, we must be clear about the developing situation, firmly grasp the opportunities, intensify the practice teaching links, and strengthen the engineering practice training so as to lay a solid foundation for the rapid development of the knowledge economy in our country.

As a type of higher education, the higher vocational education started its life quite late in our country. As a result, we have only made some primary study of and a basic exploration into what kind of knowledge and abilities our students should be equipped with, and how their practical abilities can be strengthened and their creative spirit can be developed. We have just built up some of our own features in school-running modules, which are no doubt far from perfect, and still leave much to be desired. We sincerely hope to share our experience with our broad colleagues and we are determined to make even greater efforts to search for an efficient way for the rapid development of the higher vocational education in our country.

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TELLING STORIES IN THE USE OF PORTFOLIO ASSESSMENT IN HIGHER EDUCATION: SOME IMPLEMENTATION ISSUES

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Index: Assessment, Portfolio

Abstract: Evidence has shown that the results of traditional standardized tests characterized by pencil and paper formats, multiple-choice responses and time-restricted completion are not sufficient in telling how pupils engage in the learning process and their progress in learning. In addition, these tests tend to emphasize on the assessment of basic skills but fail to measure higher level thinking and problem solving skills. This inadequacy can be addressed by incorporating authentic assessment approaches such as performance tasks, portfolios, and grading for team effort. This paper aims to tell stories from an action learning research group whose members have used 'portfolio' as an alternative assessment strategy in higher education.

TRENDS IN ASSESSMENT

The term assessment usually refers to the full range of information gathered and compiled by teachers about their students and sometimes their classrooms (Freeman & Lewis, 1998). Information on students and learning are formally collected through tests, examinations and continuous assessment; and informally through observation and verbal exchange. On the other hand, information about the classroom and teaching obtained from informal student feedback and formal course evaluation can also form part of the assessment.

Since early 1990's, a number of educators have focused their assessment and evaluation efforts on lessening the misuses of standard tests, improving existing tests, and most importantly, developing alternative means of assessment including portfolio. The focus of assessment has shifted from the measurement approach to an evidential one (Freeman & Lewis, 1998). While the measurement approach stems from psychology and science, the evidential approach is rooted in sociological and legal models. The evidential approach does not claim absolute objectivity, but seeks to draw justifiable conclusions from evidence drawn from a range of different sources. The student often plays a key role in deciding what should be offered as evidence. Portfolios are usually the means for presenting the evidence, and can even be used as a reporting device.'

PORTFOLIO ASSESSMENT: CONCEPT AND CHARACTERISTICS

Portfolio' embodies a number of key features including:

- Students are directly involved in assessment, working proactively including provision of evidence.

- Teachers are no longer the sole marker or assessor. Self and peer evaluation form part of the assessment process. The role of teachers becomes multifaceted.
- Assessment moves from mainly summative and norm-referenced to continuous and criterion-referenced.
- Assessment arrangements are more flexible, for example, in time, method and location.
- Reporting of assessment results is more complex, employing methods like profile and portfolio.

Portfolio assessment is closely related to performance and authentic assessment. Instead of having students respond to paper-and-pencil tests, performance assessment whose emphasis is on procedural knowledge acquisition, requires students to demonstrate that they can perform particular tasks. However, authentic assessment takes this a step further by stipulating that a real-life setting in these demonstrations.

Portfolio assessment involves students gathering evidence on an on-going basis from multiple indicators of progress to demonstrate achievements over time that meet course goals. In this sense, portfolios are both descriptive and evaluative in nature as they provide tangible products in the form of a folder, a notebook, or a box that document students' effort and intangibly an insight into students' learning process and their ability to perform particular tasks. Portfolio assessment therefore includes both process and product. The process involves students and teachers working collaboratively to create a portfolio that will be both multidimensional and dynamic. Through both process and product, students' learning and growth can be assessed.

The process of portfolio development includes four distinctive aspects: reflection, negotiated portfolio planning, conferences, assessment and evaluation.

Reflection, a key element of portfolio assessment, requires students to make judgements about the adequacy and effectiveness of their own knowledge, performance, beliefs, or effects for the purpose of self-improvement. Reflective processes help us conceptualize and formulate our rules and principles based on which we build our knowledge, personal theories and judgement. Through thinking and re-thinking systematically, experiences become more valuable. However, students need to understand reflectivity, see its value, and learn how to reflect logically and methodologically aspects of their experience (King & Kitchener, 1994; McLaughlin, 1995).

Negotiated portfolio planning can be seen as part of the process of curriculum enactment, which can be viewed as the educational experiences jointly, shaped by student and teacher. Underlying this perspective, knowledge is individualized. It is also a personal developmental process, both for the student and the teacher. From my personal experience, active student involvement in the planning stage significantly increases the sense of responsibility and ownership. Students feel that they can perform reasonably well as expectations are clear and the portfolios truly represent their effort and demonstrate their ability.

The success of the portfolio process relies largely on the mutual understanding between the student and the tutor developed through formal and informal conferences. We argue strongly that time spent on actively interact, negotiate meaning, and clarify terminology with students is time well spent and should be invested wisely. Thus conferences should focus on examining aspects of the portfolio process that are of particular concern to the student, exploring the development of certain pieces of evidence, or assuring possible anxiety.

Implicit in the use of portfolios is the assumption that each student's work is highly personalized and idiosyncratic. Because of these inherent differences among students, evaluation can be extremely challenging. Evaluation is distinguished form of assessment. Evaluation embraces the judgement and decisions, and can be either conducted by self or peer or both. Portfolio assessment is formative and criterion-referenced. The courses of action including planning, writing rational statements and objectives, gathering evidence, sharing and presenting are integral parts of the assessment and evaluation process.

Rubrics or descriptors of performance are used to facilitate the alignment of portfolios with the reporting process. They are the scoring criteria and represent a continuum of performance, and they give a common ground for discussing the portfolio development process and the product.

SOME ISSUES ON IMPLEMENTATION

The concept and characteristics of "portfolio assessment" puts forward two main arguments for its adoption – it is a student-centered approach, and it has positive implications for teaching and learning (Clemmons et al, 1993; Kemp & Toperoff, 1998; Paulson, Paulson, & Meyer, 1991).

The teacher/school perspective However, it is anticipated that the road toward "portfolio assessment" will not be a smooth one. The use of "portfolio" will create "additional demands on teachers and students as well as on school resources." (Sweet, 1993) A major concern involves finding time for the regular student-teacher meetings and to effectively assess student portfolios, particularly when the class size is large (Farr & Tone, 1994). Furthermore, the lack of resources, such as a room for meeting; a place to store student portfolios; and the availability of audio-visual equipment to collect evidence, could seriously dampen any enthusiasm to implement portfolio assessment.

In the development stage, there is a need to (1) identify competencies to be assessed in student portfolios that matches the learning objectives of the module; (2) select the learning activities that will work well together; and (3) make some decisions on possible portfolio evidence and assessment mechanisms.

It is understandable that not every teacher will embrace the concept of "portfolio assessment" with equal zest. Teachers need to familiarize themselves with the concept and be convinced of its value before they are willing make a commitment toward its implementation.

Teachers involved in using portfolio need to periodically meet and share their experience on using this concept among themselves. Nationally and internationally, they should continue to learn more about "portfolio assessment" by attending relevant seminars, workshops, and conferences on the use of portfolios. Likewise, students need instruction on how to carry out work that is required in assembling a portfolio.

The student perspective In this aspect, four major areas of concern in implementation deserve special attention: student anxiety in conducting reflection and self-analysis; student workload; student-tutor relationship; and effectiveness of portfolio conversations.

Student anxiety in conducting reflection and self-analysis is understandable because of their inexperience and inadequacy in recalling and expressing their thoughts. To improve on this situation, it is for students to learn about thinking skills and practise how to reflect systematically.

One of the pitfalls in portfolio development is the underestimation of student workload both by the tutors and students themselves. Overloading resulted from time under-allocation and over-involvement cannot be ignored. A related problem is the individual variation in the time spent on portfolio development. It varies significantly from the enthusiastic and committed students to those who "put a few things together" for submission. Tutors should provide appropriate guidance in helping students to manage time realistically and appropriately and techniques such as scheduling will assist students in completing identified tasks promptly.

One key asset of portfolios is that they provide a vehicle for student and tutor collaboration particularly on assessment. During the process of portfolio development and assessment, the tutor and students need to negotiate between themselves on who decides on what goes into the portfolio; how the materials will be analyzed; when it will be analyzed; and how information will be shared.

Since portfolio assessment deviates significantly from common practices when assessment is something done *to* student rather than done *with* students, effective two-way communication is the key to success in the tutor-student relationship. Take the ongoing setting of goals based on the students' reflections of their past efforts as an example, both tutors and students have expressed mutual doubts on the efficiency and effectiveness of portfolio conferences or dialogues. These dialogues are considered as time-consuming and unproductive. Thus it is apparent that effective skills in facilitating portfolio conferences have to be learned. In this connection, meeting management strategies such as having an agenda; reading materials before meetings; keeping the sessions on tasks and on time; reviewing and recording decisions made; and setting tasks for the next session will be useful.

OUR OWN REFLECTIVE LEARNING ON THE USE OF PORTFOLIO THROUGH DIALOGUE

Assessment is a core element of causing quality in higher education if it stresses on improvement. While the general trend in assessment can be seen as taking shift from the measurement approach to evidential approach (Freeman & Lewis, 1998), there is also suggestion that learning in higher education should move from the institutional controlled model to a learner development model. Students in higher education should be given the responsibility of their own learning and the related assessment.

"Since we are using 'portfolio assessment' for the first time, the teachers involved in this endeavor need to periodically meet and share their experience on using this concept among themselves. Feedback collected from asking each other critical questions of our own practice will help us to grow professionally."

"I was also learning more about them as learners and as people – that being bonus."

"Over the last 5 years this strategy has helped me bring about a change in student learning related to their attitudes toward learning making them more reflective, more empowered and at the same time improving their English communication skills as they are native Chinese speaking students."

"My task is to focus on how I used it in my classes to change the way the students began to think about themselves and their learning and as a result how I began to learn more about them as learners and as individuals … as they began to learn more, much more …"

"I found that students have developed a greater understanding of their specific learning style when they self-evaluate and reflect on the evidence they have selected for inclusion in the portfolio … they have learned to use a wider variety of learning styles …"

"… I feel that my students are doing what the research on portfolio says they will do: they can think more reflectively about themselves and their learning; they think about continuously improving their skills; they feel in charge of their own learning; they like working in teams; and they write better in English."

"Nonetheless, we have to explore and try out a different kind of relationship with our students, and I discover that a strong sense of trust is required."

CONCLUSION

From the above extract of dialogue, professional understanding and insights were gained in the conceptualization and implementation of portfolio assessment in higher education settings. Four key aspects emerged from this learning experience. First, the belief that portfolio assessment could enhance teaching and learning was confirmed. Second, using an alternative assessment strategy was innovative requiring re-conceptualization of the nature of learning and changes in beliefs, attitude and practice. Third, we learned to face the constraints and difficulties encountered during implementation. Fourth, based on our first-hand knowledge, we are able to suggest a number of measures to overcome these problems, and they were considered applicable to wider contexts.

A more comprehensive and systematic professional development strategy has to be carefully conceived and evolved. We would envisage at least five levels of actions. First, positive attitude and committed attitude of individuals is fundamental. Second, self-help groups with specific interest and focus should be encouraged. Administrative support and recognition of workload and achievement are useful for initiating and sustaining such change. Third, departmental groups with identified departmental strategic objectives need to be developed. Fourth, institution policy on systematic staff development on various professional aspects including teaching quality should be carefully planned with a good understanding of practical constraints in implementation. Implementation itself has to be coordinated. Finally, genuine quality culture with continual, self-generated improvement effort can be promoted through institutional collaboration. Through joint institutional activities, innovations in professional development can be disseminated and shared. This also provides basis for community knowledge that will establish wider recognition and prestige.

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THE EFFECTS OF THE WHOLE EDUCATIONAL EXPERIENCE ON GRADUATE EMPLOYABILITY AND FURTHER STUDY

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Index: Student development, employability, extra-curricular activities

Abstract: A study of recent graduates was conducted in which their present status, campus life experiences, perceptions of their own performances in work or study, and suggestions on improving the curriculum design were explored. Altogether, 315 completed questionnaires were received and the result confirmed that students' campus involvement positively but weakly correlated with their perceived performances in both working and studying environments after graduation. To enhance students' involvement in attaining whole educational experience, group-based programmes involving peer activities are suggested.

INTRODUCTION

Pursuing vocational education represents an important aspect of the school-to-work transition. It provides pathways to occupations through training students to attain a basic requirement of a profession as well as the appropriate attitudes and work-place behaviour. However, employers nowadays also seek, in addition to academic qualifications, various personality qualities, attitudes and personal attributes which classroom learning alone might not be able to provide. These personal qualities cannot be taken for granted even in graduates with very good academic qualifications. The ability to communicate, together with good motivation, potential leadership qualities, breadth of outlook and a positive attitude to change, are obvious requirements alongside technical and specialist skills.

In recent years, tertiary institutions have given more attention to the out-of-class experiences of students. The Education Commission (1999) recently suggests that admission to university should consider students' all round performances, and not just their public examination results, whereas students in formal higher education institutions should enjoy a comprehensive and rich campus life. So there is a need to "provide a better physical and learning environment to attract able students and foster their total development"[1] through providing activities and programmes to enable students to gain a broader educational experience (Pomfret & Lai, 1999b). These activities can improve personal attributes, such as communication and interpersonal skills, social and aesthetic sensibilities, physical wellbeing and a better appreciation of society and the world at large.

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[1] Goal 3 of the seven main Goals outlined in the *Total Quality Improvement: A Quality Policy dedicated to all staff within the VTC (VTC Quality Policy)*

In an ever more competitive world, these life skills are essential. The cornerstone of whole educational experience lies in the involvement of students in campus activities. However there appears to be little local information available on the relationship between wholehearted and effective extra-curricular activities participation and subsequent success in employment, further study and personal achievement. However, large numbers of studies of college undergraduates in the States (Pascarella & Terenzini, 1991) have shown clearly that the greater the student's degree of involvement, the greater the learning and personal development. Whereas recent research findings even support that many important learning outcomes are negatively affected by various forms of "noninvolvement" that either isolate the student from peers or physically remove the student from the campus, such as attending part-time or being employed full-time (Astin, 1999). In this paper, we intend to explore the general performances of graduates in work or in study in relation to their campus involvement when they were students and consider strategies to enhance students' involvement to attain the whole educational experience goal.

GRADUATES' SURVEY

In an attempt to gain more insight into this area, a survey on the "Graduates' Campus Involvement, Views on Course Improvement and General Performance in Work and Further Study" was conducted in March 2000 for all graduates of full-time Certificate and Diploma courses at the Hong Kong Institute of Vocational Education (Morrison Hill) in Hong Kong. These students graduated in July 1999, after completing one- or two-year courses, and a questionnaire was sent to each graduate in March 2000. Altogether, 614 questionnaires were sent out and 315 completed returns were received through the mail. The response rate was 51.3 per cent, quite a reasonable rate for a mailed-returned survey. It is worth noting that out of all samples from those 19 classes of graduates (N=315) from five academic departments, 4 classes are one-year certificate course graduates (n=60). The present status of all the graduates, their campus life experiences, perceptions on their own performances in work or study, and suggestions on improving the curriculum design are explored.

Study Design

As a follow-up survey (see Pomfret & Lai, 1999a), part of this questionnaire is based on the "Supportive Educational Experiences Questionnaire" (SEEQ), with reference to the design of the "College Students' Experience Questionnaire" (CSEQ) of Robert Pace (1990) and the adapted version of the "University Student Experiences Questionnaire" (USEQ) of Richard Armour and Cheng Wai-ning in Hong Kong. Besides, the instruments used in two local surveys for employers of graduates (Li & Lee, 1998) and high school leavers (Cheung & Lewis, 1998) are also referenced. The self-administered close-ended mailed questionnaire for this study mainly consists of two sections. In the first section, respondents are asked to indicate their frequency in using various facilities and services in the campus by choosing along a four-point scale ranging from "very often" to "never", scoring from 4 to 1 respectively, based on their own subjective judgement instead of quantifying measures. Besides, graduates are asked to express their opinions on various suggestions for the improvement of IVE's diploma courses. The second section consists of questions relating to their personal perception of their own performance in various areas in their present working or studying environment. Respondents are asked to choose along a four-point scale for each area, according to their self-perceived performances, ranging from "excellent" to "unsatisfactory".

Respondents' Profile

Nearly two thirds (62.1%) of all respondents were male students. A significant proportion (48.0%) of the students were over 20 years old. Respondents were quite proportionately distributed with respect to the number of graduates from different departments, Commercial Studies being the highest (35.9%) and Construction (10.8%) being the lowest. Most respondents were having an overall academic award at the "pass" level (67.3%), followed by those obtaining "credit" (28.6%), a distribution quite able to reflect the overall status of graduates. Among all respondents, only 30.3% of them reflected that they had been involved in a part-time job during their final year of study, out of which 35.2% of them worked for 6 to 10 hours per week on average. About half of all respondents (49.4%) revealed that they were currently employed, 42.4% were pursuing further study, and the remaining 8.3% were not in employment or in further study as at the beginning of March 2000. Out of those who were employed, 64.7% of them reflected that their present job was relevant to their course of study, and 43.9% of them also were engaged in part-time study.

Findings

Respondents were asked to indicate how often they utilized campus facilities and services during their previous academic year. According to the graduates' self perception in utilization of facilities and services provided when they were in campus, they would rank themselves as "very often", "often", "occasionally" and "never", each with a score of 4, 3, 2 and 1. It is reflected that "using computers outside time-tabled lessons" (M=2.41, SD=.84) is the most common activity for students. In fact, computer utilization is believed to be mostly academically related. Consonant with the results of our previous study in April 1999, students' interest in extra-curricular activities is generally low, especially in areas such as attending courses on personal development topics (M=1.30, SD=.55) and participating in inter-departmental or inter-campus sports team (M=1.41, SD=.81). As nearly one third of our respondents engaged in part-time jobs during their studies, this might account for one of the reasons of low involvement.

Additionally, respondents were asked to express their personal views on various suggestions on the improvement of IVE's diploma courses. Out of all respondents, 85.3% of them "strongly agree" or "agree" for improvement of library facilities with more up-to-date publications and reference materials (M=3.35, SD=.76) and 82.8% of them on further modernization of campus recreational and teaching facilities (M=3.18, SD=.73). It should be noted that quite a significant proportion (77.3%) of our graduates "strongly agree" or "agree" to incorporate broader training, such as leadership skills, knowledge of world-wide issues, interviewing and presentation skills, problem-solving techniques, etc. into the curriculum (M=3.15, SD=.8). As the general involvement of students in campus activities is relatively low, it is not strange to note that only 39.3% of the respondents "strongly agree" or "agree" to the suggestion that students' participation in extra-curricular activities should form part of overall assessment (M=2.35, SD=1.00). Since, at the moment, students' active involvement in campus life is not being recognized in their testimonials, we cannot expect our students to spend more time in extra-curricular activities when their counterparts are working hard to attain outstanding academic results, and only the latter is officially reflected and recognized in performance transcripts.

Graduates were asked to reflect views on their own performances in their present working environment, along a Likert-type scale ranging from "excellent" (4) to "unsatisfactory" (1). For those graduates who are employed, 75.6% of them indicate that they are either "excellent" or "good" in establishing good relations with colleagues (M=2.99, SD=.75). Other self-perceived strong areas include "flexibility and adaptability in managing tasks" (M=2.72, SD=.75) and "involvement in team work" (M=2.72, SD=.73). On the other hand, our graduates revealed that they are relatively weak in "commercial acumen" (M=2.06, SD=.70) and "ability to communicate in English" (M=2.10, SD=.64). For those who are pursuing further study, their self-perceived areas of strength and weakness are quite similar with those who are employed. But it is worth noting that graduates are comparatively performing better in the working environment than in further study, at least in their own perception.

It was intended to study if there are differences between the students' involvement in campus activities and their perception of their own performances in work and in further study. In correlation analysis, the study employs the Pearson product moment correlation coefficient (Pearson's r). Values of the correlation coefficient (r) range from 0 (no relationship) to + or – 1.00 (a perfect relationship). A negative relationship is indicated by a minus sign and a positive relationship by a plus sign. As a result, from analyzing the respondents' data, we might conclude that students' involvement in campus life is positively correlated with their self-perceived working performances after graduation, especially in the areas of "commercial acumen", "analytical reasoning when facing challenges" and "innovative capacity", but such correlation is rather low (see Table 1). From another angle, we might realize that students who are more actively involved in volunteer social services organized by civic education coordinators, student counsellors and student clubs on campus perform better in work (12 out of 16 areas of perceived working performance). Whereas, on the other hand, for those students who are pursuing further study, campus involvement is also low, but positively correlated with individual instead of all areas of their own perceived performances in study, especially in areas relating to "involvement in team work" and "flexibility and adaptability in managing tasks". We might also realize that students' utilization of library facilities and participation in team-work projects have slight statistical significance in most areas of performances in further study (see Table 2). Comparatively speaking, students' active involvement in campus activities is positively correlated with their performances in work more than that in pursuing further study.

Besides, from the data collected in this study, we can only conclude that graduates' ability in taking up early first full time employment was only slightly correlated with their frequency in "attending events organized by student bodies" (n=154, r=.174, p=.031) and "participating in working committee's meeting of a student organization" (n=155, r=.179, p=.025). Whereas, when overall academic result was concerned, it was reflected that there was only a slight correlation between good academic results with students' "utilization of computer on campus outside time-tabled lessons" (N=314, r=.176, p=.002), "attendance of events organized by study bodies" (N=314, r=.156, p=.006) and "participation in inter-departmental or inter-campus sports team" (N=315, r=.117, p=.038).

CONCLUSION

The study confirms that the students' campus involvement positively but weakly correlates with their perceived performances in both working and studying environments after graduation. Among various areas of campus involvement, students' participation in social services is most significantly correlated with good performance in work, whereas their involvement in teamwork projects and frequent utilization of library facilities are positively correlated with their ability in further study. Although our study cannot fully support the importance of students' campus involvement as a powerful means of enhancing performances after graduation just from the students' self-perceived measurement based on subjective judgment, a growing body of research suggests that active involvement gives rise to changes in affective and cognitive outcomes when more quantifying psychological instruments or observations and reports of behaviour, accompanying with carefully controlled measures researched over many years, are employed (see Astin, 1977, 1993, 1999; Kuh, 1993; Kuh, Krehbiel & MacKay, 1988; Pascarella & Terenzini, 1991). However, our recent study may serve as a baseline for future surveys in the vocational education sector.

As proposed in the recently published *Education Blueprint for the 21st Century* by the Hong Kong Education Commission (1999), it is clearly stated that "students should have a comprehensive learning experience through formal, non-formal and informal modes." However, students' out-of-class involvement is not fully recognized under our existing assessment scheme, and it is time to consider if some form of modification could be made, such as systematically inputting students' campus involvement and participation data into their transcripts, issuing certificates to recognize active students involvement in campus-wide programmes and community services, etc. In the short run, to improve IVE's curriculum and campus facilities in meeting the needs of our graduates, it is worth to emphasize more on improving library facilities, encouraging teamwork projects during coursework, enhancing social service opportunities in serving the community and incorporating broader training, such as leadership skills, knowledge of world-wide issues, interviewing and presentation skills, and problem-solving techniques into the curriculum. Whereas, in the long run, IVE might need to review its assessment criteria to incorporate students' out-of-class involvement performances into the overall assessment scheme, following whole education principles, and borrowing the system of nearly all tertiary education institutions in Mainland China[2] or the City University of Hong Kong.[3]

Recent research findings confirm that the strongest single source of influence on cognitive and affective development is the student's peer group. In particular, the characteristics of the peer group and the extent of the student's interaction with that peer group have enormous potential for influencing virtually all aspects of the student's educational and personal development (Astin, 1999). Generally speaking, the greater the interaction with peers, the more favorable the outcome. Indeed, our study also reflects that "participation in teamwork projects with other students" is the highest form of students' involvement in campus. Peer group influence is powerful because it has the capacity to involve the student more intensely in the educational experience. So, to achieve the goal of whole education experiences, the campus should start from group-based activities in which peer groups are involved. Student affairs work in general should play a much more central role as most peer groups operate primarily outside of the formal classroom, and much of that out-of-class life falls under the purview of student affairs.[4]

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[2] Like other tertiary education institutions, the South China Normal University adopts a "comprehensive appraisal system" (????) in which students' performance in all three areas, namely, moral behaviour, academic performance and cultural/sports involvement, is transferred into "points" for recognition of awards when graduated (see Lai, 1999b). Behaviours are quantified and measurable and points will be added or deducted according to the performances. Each area carries a weighted percentage of 20%, 70% and 10%, out of 100%.

[3] The Student Development Services of the City University of Hong Kong launched a "Whole Person Development (WPD) Award Scheme" to encourage and motivate students to take part in various programmes related to seven areas of development, namely, spiritual, intellectual, physical, social, aesthetic, career and emotional, to become all round persons. Points will be awarded to students after attending programmes according to duration and the extent of involvement. Depending on the points gained, students will receive either the Award of Achievement or Award of Excellence.

[4] Interested readers can also refer to Lai (1999a) for a more detailed analysis of ways to enhance students' involvement.

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Table 1: Pearson Correlation Coefficients (r) of Campus Involvement with Working Environment Performance (n=156)

	Campus facilities and rooms	Events atten-dance	Athletic /aquatic partici-pation	Joined sports team	Social services	Sought help from another student	Attend personal develop-ment course	Attend civic educa-tion pro-grams	Use sports facilities outside lessons
Knowledge and skills for jobs	.093	.146	.012	.059	.170*	.181*	.114	.202*	-.040
Ability to communicate in English	.170*	.195*	.101	.153	.256**	.138	.169*	.091	.085
Ability to communicate in Chinese	.191*	.140	.153	.211**	.186*	.179*	.130	.121	.111
Analytical reasoning when challenged	.317**	.212**	.228**	.274**	.245**	.194*	.213**	.086	.298**
Observance of safety precautions	.124	.108	.130	.106	.127	.202*	.166*	.187*	.081
Ability in job planning	.153	.118	.102	.096	.144	.218**	.092	.177*	.135
Presentation in front of a group	.153	.208**	.213**	.260**	.152	.097	.149	.064	.122
Has good relations with colleagues	.078	.217**	.077	.134	.111	.208**	.148	.110	.104
Innovative capacity	.234**	.212**	.122	.156	.235**	.188*	.201*	.180*	.300**
Ability to grow and learn on my own	.165	.226**	.069	.154	.292**	.120	.132	.216**	.119
Flexibility and adaptability in managing tasks	.118	.129	.184*	.068	.198*	.191*	.200*	.093	.076
Ability to persevere and get results	.174*	.147	.117	.119	.198*	.186*	.059	.211**	.066
Common sense in dealing with problems	.079	.110	.108	.143	.184*	.103	.169*	.126	.005
Commercial acumen	.248**	.160*	.251**	.264**	.280**	.192*	.291**	.194*	.296**
Awareness of the ethical values and moral concerns in the workplace	.057	.115	.132	.144	.195*	.135	.111	.105	-.023
Involvement in team work	.121	.195*	.138	.241**	.228**	.281**	.146	.266**	.154

* Significant at 0.05 level (2-tailed) ** Significant at 0.01 level (2-tailed)

Table 2: Pearson Correlation Coefficients (*r*) of Campus Involvement with Further Study Performance (*n*=133)

	Use of library	Use of com-puter	Athletic /aquatic partici-pation	Joined sports team	Social services	Sought help from another student	Attend personal develop-ment course	Parti-cipate in team-work project	Use sports facilities outside lessons
Knowledge and skills required	.385**	.057	.126	.195*	.178*	.103	.063	.271**	.014
Ability to communicate in English	.257**	.259**	.205*	.167	.172*	.059	.164	.117	-.006
Ability to communicate in Chinese	.131	.199*	.106	.152	.026	.049	.096	.067	.157
Analytical reasoning when challenged	.112	-.094	.225**	.108	-.062	.050	.000	.170	.127
Observance of safety precautions	.109	-.115	.181*	.089	.105	-.075	.024	.002	.123
Ability in job planning	.092	-.024	.141	.158	.147	.137	.163	.165	-.061
Presentation in front of a group	.203*	.053	.057	.174*	.009	.059	.166	.220*	.015
Has good relations with classmates	.027	-.138	.118	.186*	-.011	.035	.058	.115	.167
Innovative capacity	.163	-.010	.197	.027	.044	.020	.104	.076	-.021
Ability to grow and learn on my own	.325**	.046	.112	.026	.103	.114	.134	.347**	.015
Flexibility and adaptability in managing tasks	.247**	-.050	.180*	.080	.177*	.210*	.096	.238**	.016
Ability to persevere and get results	.239**	.200*	.108	.026	.063	.050	-.010	.222*	.072
Common sense in dealing with problems	.181*	-.047	.114	.107	.135	.142	.066	.184*	-.023
Commercial acumen	.214*	.008	.206*	.172*	.189*	.041	.108	.152	.042
Awareness of the ethical values and moral concerns in your study	.152	-.005	.209*	.165	.149	.053	.103	.181*	-.037
Involvement in team work	.160	.052	.237**	.215*	.101	.187*	.217*	.334**	.251**

* Significant at 0.05 level (2-tailed) ** Significant at 0.01 level (2-tailed)

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FLEXIBLE LEARNING PROGRAMME
IN
VOCATIONAL EDUCATION:
A CASE STUDY

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Abstract The Vocational Training Council (VTC) is undergoing a transformation that has reshaped many aspects of its organization; in particular, the course design and the way these courses are delivered. This paper presents a case study of the planning and design of a typical part-time vocational course curriculum at the Hong Kong Institute of Vocation Education (HKIVE). It outlines the considerations that the course team has to face. First, the aims of the Higher Certificate and Higher Diploma courses are highlighted. The major influence on the course aims for the curriculum, the social and economic efficiency factor, is discussed. A further aim, the learner-centered consideration, is identified. Given clear aims, goals and objectives, the design of the course structure proceeds. Subsequently, a suite of curriculum is proposed.

1. INTRODUCTION

The VTC is now undergoing a transformation that has reshaped many aspects of its operation, ranging from management structure to the design of the courses and the way they are delivered.

This transformation focusses on a new mission statement:

> *"To provide high quality, cost-effective, internationally acceptable vocational education, training and qualifications for student of all ages, directly applicable to the requirements of Hong Kong's employers"*

To implement this mission, seven objectives have been identified [1]. These objectives include the creation of an environment in which the various major components associated with the VTC, such as the employer, students and employees can play an effective and collaborative part in realizing the mission. This requires a radical change in the organisation's structure and culture.

Among the many reforms and restructuring, the radical change in the design of its courses has the most far ranging effect. This requires the VTC to have a shift of paradigm in course design and the way these courses are delivered. This paper presents a case study of the planning and design of a typical part-time vocational course curriculum at the Hong Kong Institute of Vocational Education (HKIVE). It outlines the considerations that the course team has to face.

Section 2 outlines the current practice in the operation of part-time courses in HKIVE. Together with an overview of the needs for a flexible learning program, it gives some background on the various considerations needed for the new courses.

In section 3, the aims of the Higher Certificate and Higher Diploma courses are highlighted. The major influence on the course aims for the curriculum, the *social and economic efficiency* factor, is discussed. The focus of intentions, contents, learning and assessment are also discussed.

Given the clear aims, goals and its various focus, section 4 details the design of the course structure. Subsequently, a suite of curriculum is proposed based on the new design paradigm. The course planning team focus on an approach based on flexible learning in which the learning program of the curriculum places emphasis on flexible learning and transferable skills. A Module Accumulation (MAC) course structure is proposed so that the learning program has a framework of flexibility. Finally, the overall design of these two courses is presented in Section 5 together with some practical considerations.

2. COMPARISON OF CONVENTIONAL COURSE AND FLEXIBLE LEARNING PROGRAM

Traditionally, the HKIVE courses have a rigid curriculum and timetable based on the academic year. Enrolling on courses begins in September and the academic year ends in the summer term. The learning is arranged in a fixed sequence, with assessment occurring at a fixed point for the whole group of students. Courses have an integrated curriculum designed by a course planning team and accredited by awarding and professional bodies[3].

More recently in vocational education, there has been a trend to provide a coherent curricula within a diversified course structure[4]. In contrast to the conventional course, a learning program provides an initial guideline, counseling and assessment to establish individual starting point. Flexible learning program is a major innovation in curriculum to address the requirement of flexibility and diversity, particularly appropriate to students already in the workforce. It challenges the conventions of the traditional taught course structure. Entry and exit points for the learner depend on achievements both prior to and during the study. There are no assumptions about the pace of the learning. The delivery of the learning program is not constrained by the conventional academic year. Programs are constructed using the building block of a module (or credits). The differences between the conventional taught course and a flexible learning program are highlight and shown in Table 1.

Flexible learning program is the key to this proposal in which a Module Accumulation Course (MAC) structure is the major vehicle to implement a viable and cost effective vocational training program.

Stage	Conventional Course	Flexible Learning Program
Before entry	• Students choose a specific course to study • Each course contains a pre-determined group of subjects, related to a particular profession.	• Students choose a discipline of study with the specific curriculum being selected later • Different modules can lead to a range of different qualifications • Students can join the program at different points (recognize prior learning) • Select initial rate of study
At entry	• Based on previous qualifications • Require subject-based induction	• Based on the principle of open access • Need guidance on module choice • Require induction into the structure of the program
During Program	• Curriculum is compulsory and delivered over a set period of time and in a set sequence • Learning style is based on pedagogy[1]	• Student can maximized the effectiveness of the modules to achieve different qualification outcomes and match their vocational needs • Learning style is based on Andragogy[2]
At exit	• Student will attain the qualification	• Student will have choice over the qualification outcome at exit which depend on the module combinations

***Table 1** : Comparison of Conventional course and Flexible learning program*

2.1 Flexible learning program in IVE

A review was conducted into the operation of Higher Certificate courses within the former Technical Colleges of the VTC and it recommended the adoption of a more flexible approach to course delivery. This was in response to the acknowledged high attrition rates on the courses, with an overall cohort completion rate of 53%. Subsequently, the General Academic Regulations were amended to support the Module Accumulation (MAC) model and a working party established in March 1999 to formulate guidelines for their operation.

The Department of Electrical & Communications Eng. conducted a pilot course design exercise for two PTE courses (HC and HD in Telecommunications Engineering) which will start their MAC mode of operation in Sept. 2001. To establish a flexible learning program, the following provisions are necessary :

- a mission and set of policies

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[1] The art and science of teaching children, it is more commonly associated with teacher-dominated approaches to learning

[2] The theory of adult learning, which stresses the value of approaches which build upon the exiting experience of the learner.

- the provision of resources for student guidance
- a unit-base program designed to accommodate the different needs of individual learners
- procedures for recognizing prior experience
- MIS capable of tracking individual learners

This gives course planners some parameters for its course design process.

3. AIMS, GOALS AND OBJECTIVES OF THE LEARNING PROGRAMME

As far as curriculum design is concerned, there are two main aims of the part-time Higher Certificate (HC) and Higher Diploma (HD) in Telecommunication Engineering. The prime aim is to produce Associate Engineers in the field of Telecommunications Engineering who will be capable of satisfying the needs of industry and commerce in Hong Kong. It achieves this by providing persons with a suitable technical education that will enable them to take up careers where they can make a valuable contribution to the design, operation and maintenance of telecommunications systems. This type of particular aim is viable for adult education. The second aim is to satisfy the needs of the individual learner to obtain a vocational education that can provide them with a career path so that they can integrate into the society.

In vocational education, a strong element of the *social and economic efficiency* factor is embedded in the course aims. As far as curriculum design is concern, four components encompass this approach, namely: *intentions*; *contents; teaching/learning methods*; and *assessment*[2]. The focus of each component is:

1. *Intentions* : to provide for the current and future manpower needs of society
2. *Contents* : to focus on knowledge and skills which are useful and relevant to future employment
3. *Teaching/learning methods* : to emphasize application and skill mastery
4. *Assessment* : to emphasize assessing students' ability to apply knowledge and skills

3.1 Intentions

For part-time courses, there is a lesser requirement to accomplish its main *intentions*. Most of the learners already have a job in the related field and they possess some of the skills and knowledge before enrolling on the course. However, in a fast moving industry such as telecommunications, skills and knowledge can become obsolete in just a few years. There is a strong intention and incentive for these learners to engage in life long learning. Thus, the intention of the course is to produce graduates who are capable of self-learning and provide a framework for on-going self learning. Life-long learning is an increasingly important skill for learners to meet the changing needs of the society and industry.

3.2 Contents

The focus of the *contents* of the course is to provide career-oriented training for part-time HC and HD students. Often, the learner is the best person to plan his/her learning to best match his/her career planning. Thus, flexible learning is essential to contemporary vocation education to allow the learner to decide which relevant knowledge and skills to acquire and the best mode of studying. It also reinforces training to plan their own career and professional development.

Using this approach, the learner can decide which knowledge and skills will be most useful in the fast moving telecommunications industry. In addition, they can decide the pace of learning. Study becomes a partnership between the teacher as facilitator and the students as client.

3.3 Teaching and Learning Methods

The learning program was designed to include a range of attainments, including development of inter-personal skills, practical skills and technical skills. The five themes of the learning program identified are:

1. Practical and Professional Skills - economic considerations and management
2. Embedded Systems and Instrumentation - role of computing and experimental techniques
3. Electronic Principles and System Design - principles of electronic engineering and communications theory
4. Communications Theory - fundamentals of telecommunications engineering
5. Applications to Communications Systems - application of principles to real systems and networks

The five themes identified are practical in nature and designed to meet the needs of local industry and commerce. As a whole, they also satisfy the personal growth of the individual.

In the planning of the course, these themes are identified in three aspects: *knowledge, skill* and *attitudes*. *Knowledge* corresponds to the cognitive domain in six categories: *recall, comprehension, application, analysis, synthesis* and *evaluation*. Each category involves a higher degree of complexity than the one preceding it. The coverage of knowledge is addressed in the themes of the learning program. In particular, higher levels of cognitive skill, such as the ability to apply principles, the power of analysis and evaluation, are encouraged in the senior level of the course.

Skill involves the ability to perform a task (either physical or mental). This corresponds to the psychomotor domain. Practical skills are identified and integrated into the Course so that physical skills are the attainments. Likewise, communications skills and the ability for critical observation are considered to be mental skills which they are promoted in the learning themes of the Course.

Attitudes deal with the way of thinking about something and can be described in the affective domain (concerned with feelings). It can refer to a student's attitude to himself/herself, his/her family and friends, his/her job or society in general. Professional ethics, cooperation and tolerance are examples of values which this course tries to encourage. It is more difficult to describe and measure this learning outcome from the learning themes of the Course, but these elements of learning (i.e. attitudes) are considered throughout the design of the Course. For example, the study units of Project, QA and Project Management encourage the learning outcomes that students can work both in a team and perform tasks independently.

With these design parameters in mind, the overall learning outcome should ensure the students can:

1. understand the basic underlying theory of telecommunications systems;
2. utilise computers and embedded systems in the design, evaluation, control and instrumentation of communications systems;
3. apply basic electronic circuit design techniques in telecommunications systems;
4. appreciate the characteristics of the various types of telecommunications system encountered in Hong Kong; and

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5. make a contribution to the overall design, implementation and operation of a communications system.

3.4 Balance of Assessments and Assessment Framework

Creating a comprehensive assessment framework is one of the most important tasks for a curriculum designer. From the viewpoint of the learners and instructor, assessment fulfils two main functions. First, it has an element of *formative* assessment. It offers feedback to the learner about his or her strengths and weaknesses and identifies measures needed to improve performance, for both learner and instructor. Second, it provides evidence for a grading decision. This is known as *summative* assessment.

In many vocational courses, it is desirable that the assessment of the learning program is based upon the assessment of performance in the workplace or an environment similar to the workplace. This can be broken into units of competence which are assessed through performance criteria related to each competence. When candidates are judged to have achieved all the elements of competence necessary for competent performance of the particular occupational role, they become eligible for the aware of HC or HD. Table 2 outlines the essential assessment tools when assessing learners in their affective, psychomotor and cognitive domains. These are also based on holistic assessment in which different elements and evidences are collected as part of the assessment. The evidence may take many forms. Although it is desirable to collect different evidence to give an accurate representation of the students' level of competence, it is understood the tasks could become very tedious and expensive to operate. For each module, there are many specific learning outcomes in which evidence can be collected. In vocational education, many of these should rely on competence based assessment. Nevertheless, the following factors need to be considered when the assessment framework is planned:

- Accessibility : A good assessment should aim to be transparent. This means that the learner has the right of access to all information on how he or she is to be assessed. The use of a computer-based MIS allows students to query their own academic standing. It also facilitates the tutor entering state marks effectively.
- Consistency : The course team agree on a consistent approach to issues such as grading and the timing and nature of individual assessments. This forms part of the teaching and learning package that is commonly shared by teaching teams.

Affective domain

1. testimony of others e.g. supervisors, clients
2. simulations/role plays
3. projects

Psychomotor domain

1. observation of workplace activity (or activity related to workplace such as trouble-shooting, installation)
2. candidates portfolios with extensive record of work
3. observation of workplace products e.g. records, reports, schematic diagram, program, etc

Cognitive domain

1. examination of knowledge context
2. assessment of prior achievement
3. oral questioning
4. project work

***Table 2** : Essential Tools for Competence Based Assessment*

The method of assessment is another important aspect that the course team needs to consider. Efforts were made to ensure the *validity* and *reliability* of the assessments. Assessment plays a major role in a course with Module Accumulation. A pragmatic approach was adopted where existing practice in assessment can fit in with the new course design. In particular, the year-end examination is replaced with an end-of-module assessment. An assessment framework is proposed to allow flexibility and practicality. In particular, competence based assessment is advocated where learners are being assessed in all aspects of knowledge, skills and attitudes.

4. OVERALL DESIGN OF THE COURSES

The learning themes are divided into 3 areas or grouping which are based on the full-time D/HD in Telecommunications of the IVE Electrical & Telecommunications Course Board. Table 3 shows the learning program consisting of modules from *support*, *core* and *elective* groups. There are 16 credits, 20 credits and 16 credits in each group respectively. Students are free to choose from these modules, but to be eligible for award of HC in Telecommunications, he/she is required to have a total of 36 credits. In particular, a minimum of 8 credits is chosen from the support group. Likewise, he/she needs to have a minimum of 20 credits from core group and a minimum of 8 credits from elective group respectively. A total of 36 credits is required which is equivalent to 540 hours of class contact.

Group	No. of Credit	Lecture/tutorials : lab (contact hours)	pre-requisite
Support			
Engineering Maths II	4	60 : 0	Engineering Maths I or equivalent
Supervisory practice	2	30 : 0	NIL
Putonghua	2	0 : 30	NIL
English & Communication 2	4	60 : 0	English & Comm I or equivalent
QA & Project Management	4	45 : 15	NIL
Core			
Communication Electronics	4	45 : 15	COI, Introduction to Computer,
Telecom Principle 1	4	45 : 15	Electrical Material, Circuit Theory (Fundamental Knowledge in Electrical Principle)
Telecom Principle 2	4	45 : 15	TP1
Data Comm	4	45 : 15	COI, Introduction to Computer, uP Systems
uP systems	4	45 : 15	COI, Introduction to Computer,
Elective			
Enterprise Network	4	45 : 15	Data Comm, TP1, TP2, Comm Electronics
Mobile Communications	4	45 : 15	Data Comm, TP1, TP2, Comm Electronics
Comm Electronics	4	45 : 15	COI, Introduction to Computer,
EMI/EMC	4	45 : 15	Instrumentation

***Table** 3 : Modules available in HC in Telecommunications Engineering*

Similarly, in the program of HD in Telecommunications Engineering shown in Table 4, students are required to take appropriate modules from different groups. Again, there are 8 credits, 8 credits and 36 credits in each group respectively and students are free to choose from these modules. For a student to be eligible for HD in Telecommunications, he/she is required to have a total of 36 credits in which a minimum of 8 credits is selected from the support group. Likewise, he/she needs to have a minimum of 8 credits from core group and a minimum of 20 credits from the elective group respectively. Again, a total of 36 credits is required which is equivalent to 540 hours of class contact.

Group	No. of Credit	Lecture/tutorials : lab (contact hours)	pre-requisite
Support			
Putonghua	2	0 : 30	NIL
Supervisory practice	2	30 : 0	NIL
QA & Project Management	4	45 : 15	NIL
Core			
Project	8	120: 0	at 4 elective taken form the HD courses
Elective			
LAN & WAN	4	45 : 15	Data Comm, TP1, TP2,
Broadcast & Multmedia systems	4	45 : 15	Data Comm, TP1, TP2,
Telephony	4	45 : 15	Data Comm, TP1, TP2
Broadband & Optical Communications	4	45 : 15	Data Comm, TP1, TP2, Comm. Electronics
Wireless Information Network	4	45 : 15	Data Comm, TP1, TP2,
Radar & Electronic Navigation System	4	45 : 15	TP1, TP2, Comm Electronics
Satellite Communications	4	45 : 15	TP1, TP2,
RF and Radio Comms	4	45 : 15	TP1, TP2,
Mobile Communications	4	45 : 15	Data Comm, TP1, TP2,

Table 4 *: Modules available in HD in Telecommunications Engineering*

5. STUDENT PROFILE - SCENARIOS OF 5 PTE STUDENTS

To show the planning of these modules, Table 5 presents scenarios of five students with different background representing the market segments addressed by the course. As shown in Table 6 and 7, these hypothetical cases are to illustrate some preference of the students in choosing the modules that suit their career planning.

1. Technical officer, Technician, Ass Engineer of a Fixed Network Providers - HKT, NT&T, CATV
2. Service Technician, Ass Engineer, Engineer of Mobile Operator - Hutchinson, SmartTone
3. Service support - ISP - IMS, PSInet, Linkage
4. Technician, Service Engineer of Cable and Satellite TV broadcast - CATV, IMS, AsiaSat, C&W
5. Technician, Ass Engineer of Radio/Satellite - RTHK, Department Civil Aviation, Airport Authority, Marine Department, Royal Police

***Table 5**: Scenarios of 5 Students with background following the Course Target Segments*

	Student 1	Student 2	Student 3	Student 4	Student 5
Support					
• Maths II	✓	✓	✓	✓	✓
• English & Comm	✗	✓	✓	✓	✓
• Supervisor Practice	✓	✗	✗	✓	✓
• QA & Project Management	✓	✓	✓	✗	✗
Core					
• uP	✓	✓	✓	✓	✓
• TP1	✓	✓	✓	✓	✓
• TP2	✓	✓	✓	✓	✓
• DataCom	✓	✓	✓	✓	✓
Elective					
• Mobile Comm	✓	✓	✓	✗	✗
• EMI/EMC	✗	✓	✗	✓	✓
• Comm Electronics	✓	✗	✗	✗	✓
• Enterprise Network	✓	✗	✓	✓	✗
	40 credits	**36 credits**	**36 credits**	**36 credits**	**36 credits**

***Table 6**: Modules taken required in Higher Certificate in Telecommunications Engineering*

	Student 1	**Student 2**	**Student 3**	**Student 4**	**Student 5**
Support					
• QA & Project Management	✗	✗	✗	✓	✓
• Supervisor Practice	✗	✓	✓	✗	✗
Core					
• project	✓	✓	✓	✓	✓
Elective					
• LAN & WAN	✗	✓	✗	✗	✓
• Mobile Comm	✗	✓	✓	✓	✓
• RF and Radio Comm	✗	✓	✓	✓	✓
• Broadband Comm & Optics	✓	✓	✓	✗	✗
• PSTN		✓	✓	✗	✓
• Broadcast & Multimedia System	✓	✓	✓	✓	✗
• Satellite Comm	✓	✗	✗	✓	✓
• Radar & Navigation	✓	✗	✗	✓	✓
• Wireless Information Network	✓	✓	✓	✓	✗
	40 credits	**36 credits**	**36 credits**	**36 credits**	**36 credits**

***Table** 7: Modules taken required in Higher Diploma in Telecommunications Engineering*

6. PRACTICAL CONSIDERATION

In the traditional course structure, subjects are taught over the full academic year. To give greater flexibility to the learner, the module accumulation program is based on shorter semesters. A 15-week semester is proposed for each module. At the end of each module, a form of assessment such as written examination is used to measure students' attainment. Having a shorter duration, students can more quickly gain skills relevant to their jobs and have greater flexibility to vary their study load to match work commitments. Once a student has gained a sufficient number of credits, he/she is granted the appropriate award (HC/HD). Note that there is not rigid timetable to acquire the credits, rather, students have between two and five years to complete their studies. A typical academic calendar is shown in Table 8.

These proposed courses are yet to undergo validation and detailed operation still requires planning and implementation. The course team will continue to review the learning program and the balance of assessment within the rules and procedures of the IVE General Academic Regulations. The department is also making transitional arrangements to cater for students already enrolled on an existing course.

One concern for the MAC structure is the administrative workload related to the registration of students on the various modules. This can be addressed with suitable support of a MIS together with administrative staff.

Time	Events	Reference
Wk 0	Registration	
Wk 1-7	Lecture/tutorial	Mid of September
Wk 7-8	test and other module assessment	
Wk 8 - 14	Lecture/tutorial	
Wk 15	Revision	
Wk 16	**Exam**	**early of Jan**
Wk 17	Marking	
Wk 18	Module BoE	
Wk 19	Registration of next semester	Chinese New Year
Wk 20 - Wk 26	Lecture/tutorial	
Wk 26 - Wk 27	test and other module assessment	
Wk 27 - Wk 33	Lecture/tutorial	
Wk 34	**Exam**	**end of May**
Wk 35	Marking	
Wk 36	Module BoE	
Wk 37	Course BoE and IVE APC approval	end of June

***Table 8**: A typical academic calendar*

CONCLUSIONS

The implementation of a flexible learning program is new to vocational education in Hong Kong. It allows the learners to choose their pace of study and select modules that are relevant to their own needs. This paper shows how it can be applied to evening courses. The model is well suited to part-time students who are mature and in a good position to decide their own learning program within the course framework. The learners also have a stronger incentive as the learning program has greater impact on their career planning.

Criteria for selecting the study program are also outlined and hypothetical cases presented to show how learners from different telecommunication disciplines can select their own learning program to best match their requirement.

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DISCOVERY LEARNING APPROACH TO CLASSIC ELECTRICAL MACHINES PRINCIPLES

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Index: Courseware development and delivery

Abstract: This paper aims at presenting the concept of Socratic interactions and discovery learning of classic electrical machines principles. The theories of electrical machines are by nature quite boring and abstract although there are a lot of experiments supported the theories. Traditional, students learnt the subject by drill and practice approach with standard textbooks. In the past two decades, computer is no doubt recognized to be the educational tool. The so-called "interactive" approach is applied to the learning process. Most of this approach applied to various subjects in different levels is mainly based on drill and practice. However, few packages are developed for electrical machine subject. In this paper, two different approaches "Rote Learning" and "Discovery Learning" applied to the interactive computer aided learning package of classic electric machine principles are discussed. Design of a discovery learning approach will also be presented.

INTRODUCTION

In the last decade, considerably researchers and academics in the world drew significant attentions and contributions in the development of computer aided learning packages in various subjects of different level of studies. Both individual research papers and multi-million dollar funded projects generally address computer effectiveness in a particular situation; they set out to prove that this approach is "expedient". In accordance with the educational psychology, there are two approaches applied to the interactive computer aided learning package, namely Rote Learning and Discovery Learning. These two approaches based on different learning process hierarchies are suitable for different level of subject matters. In this paper, these approaches will be discussed. Moreover, the design of this discovery learning approach for electrical machine principles is also presented.

INTERACTIVE APPROACH

1. Rote Learning Approach

Rote learning approach is a logical approach based on a behavioristic modeling theory of learning. The subject material will be broken down into facts, the relationship among the individual facts or elements can be organized hierarchically. That means the subject material is composed of local knowledge: one fact leads to another fact that exists higher in the logical structure.

The teaching methodology of the rote approach involves presenting students with exercises and reinforcing their responses. This kind of drill and practice approach is able to let students learn the topic from easier level to harder level of exercises, each building on the previous experience of the learners and leading finally to knowing the specific topic of information.

This kind of learning package can act as a psychologist and collect empirical data on learners' behavior. Predictive performance models can be developed and tested on actual data. This in turn can lead the design of the package that can better individualize the instructional path.

This rote approach is also called "drill-practice" approach has great appeal to primary and junior school levels with large populations of students who are not performing at grade level and need remedy. This approach has been proven to be successful in mathematics, reading skills and language arts.

The rote learning approach to education has strong support in educational practice. It also plays on the popular hopes that the learning packages can teach skills with which teachers have been unsuccessful, to populations with which school systems have been unsuccessful. In the rote learning approach, the computers are treated as intelligent, sympathetic instructors.

2. Discovery Learning Approach

Discovery learning approach is another learning approach differing from the rote learning approach in some subjects in which rote learning styles of teaching were not conductive to real learning. Basically, discovery learning approach is a pragmatic rather than a logical prism, so the mechanism of learning is seen as discovery.

The feature of the discovery learning approach is to set out to embed the learning environment, change the traditional classroom atmosphere and the dominant teaching style. The new learning environment is called "Scenario". A real environment would be simulated in the learning package to let learners explore by themselves. In case they need any help or computational tool, there are some guides and tools available for them. The learners best learn informally and through discovering for themselves. Psychologically, this theory received support from most of educational researchers in the world. This approach is able to understand the learners' thinking and provided a context for apprehending their thinking models by artificial intelligence method. The cognitive sciences, using computational metaphors and techniques, have provided further insights into mathematical thinking and ways of talking about learners' misconceptions. Electrical machines would be one of the subjects good for this learning approach. In this approach, graphics and visual representations play a great important role to stimulate the learner to discover and explore.

DESIGN OF DISCORVERY LEARNING APPROACH FOR ELECTRICAL MACHINES

A computer aided learning package has been developed to teach the subject of electrical machines for Higher Diploma level at Hong Kong Institute of Vocational Education. In the pilot stage, the three-phase induction motor would be taught by this package. This package is to support the normal classroom teaching and to let students learn by discovery of the real environments. The concept of the discovery learning approach is adopted in the package.

There are four main parts of the package.

1. Basic knowledge of three-phase induction motor.
2. Experiments.
3. Assessment.
4. Analysis and Result.

The flowchart of the package is shown in Fig. 1.

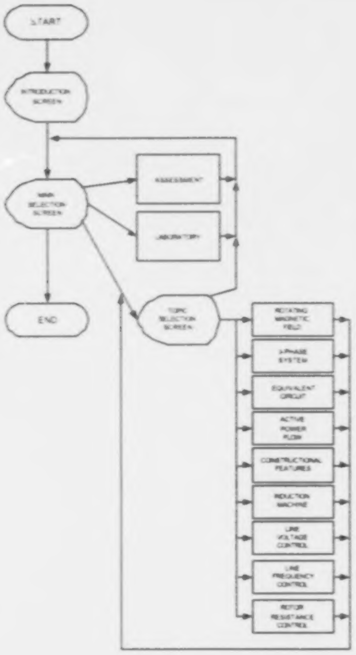
START
INTRODUCTION SCREEN
MAIN SELECTION SCREEN
ASSESSMENT
LABORATORY
END
TOPIC SELECTION SCREEN
ROTATING MAGNETIC FIELD
3-PHASE SYSTEM
EQUIVALENT CIRCUIT
ACTIVE POWER FLOW
CONSTRUCTIONAL FEATURES
INDUCTION MACHINE
LINE VOLTAGE CONTROL
LINE FREQUENCY CONTROL
ROTOR RESISTANCE CONTROL

Fig. 1: Flowchart of the Package

This educational software has 9 sessions for the basic knowledge of three-phase induction motor. In this paper, focus will be mainly put on the topics which students found difficult to understand. There are:

- Rotating Magnetic Field
- Line Frequency, Voltage and Rotor Resistance Control
- Active Power Flow

Rotating Magnetic Field

The aim of this session is to let users know what the rotating magnetic field is and how to make the rotor to rotate.

In this session, it is divided in 2 parts. The first part is for basic learning, the second part is for detail study. For the first part, a two-pole induction motor is used to demonstrate the relation between the rotor, stator and loading. Users can adjust the loads by pressing the "load" buttons to visualise the changes in slip and speed when different loading is applied. Fig.2 shows the rotation of the rotor.

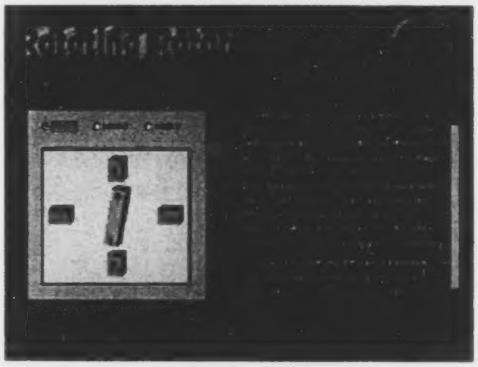

Fig. 2: Rotating Field

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In the second part, it is to focus more detail information of the rotating magnetic field.

Fig.3 shows the sinusoidal waves and the vector diagram represent the relationship between the instantaneous three-phase currents and the magnetic flux as time varies. Observing the "moving ball" shows the idea through the animation by observing the "moving ball".

In addition, users can view the movement of the rotating magnetic field that is shown in Fig.4.

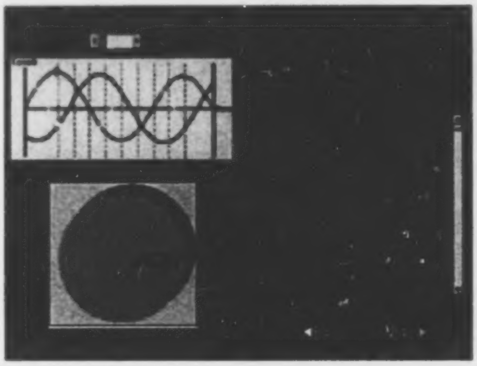

Fig. 3: Time and space movement

Fig. 4: Flux movement

Line Frequency, Voltage and Rotor Resistance Control

The aim of this topic is illustrate the effect of frequency change to torque-speed characteristics in changing frequency.

In Figs.5-7, diagrams with three buttons which are used to control the torque-speed characteristics when frequency is changed. The frequency is input by the users. "Calculate" button is used to plotted the torque-speed curve of the input frequency. When the "Frequency Change" button is pressed, the movement of the torque-speed curve is shown in the diagram with increasing frequency that can let users understand the concept by this interactive learning software package.

Line Frequency Control

Fig.5: Line Frequency Control

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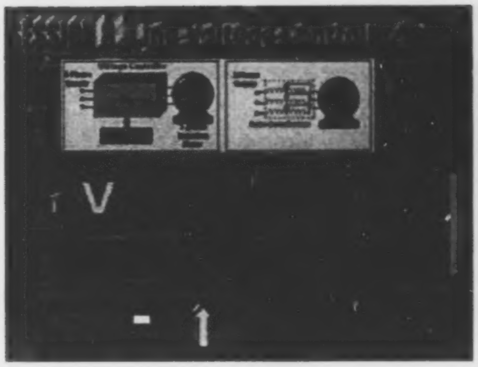

Fig.6: Line Voltage Control

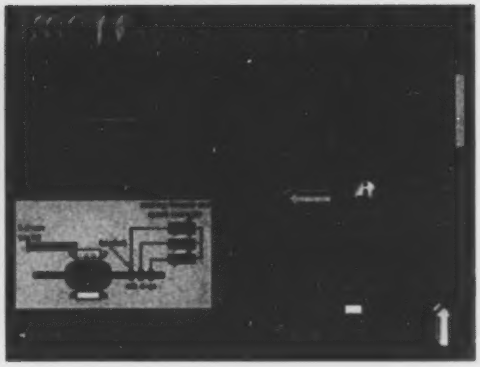

Fig.7: Rotor Resistance Control

Active Power Flow

The aim of this topic is to let users understand the power flow inside the motor when it is in normal operating condition.

In Fig.8, a switch button which is used to turn on the motor and when the motor is rotating, the arrows are shown gradually to represent the power flow inside the motor, including the iron, copper losses and frictional losses.

Fig.8: Active Power Flow

Laboratory

There are three major laboratories to let users explore the safety, wire connection and trouble shooting concepts.

In the first laboratory, a set of guides is ready for users to complete the laboratory. For example, when the users connect the Ammeter and the Voltmeter to the circuit, they have to make sure that the meters are connected in the proper connection, otherwise users will be warned by a "beep" sound. Besides, interchange of wires is not allowed.

After the circuit is connected, users can switch on the power supply, which in turn energize the motor, and hence they can adjust the resistance of the rotor starter and the slip value of the motor. Moreover, when we want to connect the wire, we should double click the terminal, at which we want to start the wiring, and then move the pointer to the other terminal, which is proposed to be the end of the wiring, and click it once.

In addition, the users cannot switch the power supply on, before the circuit is connected since this is

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very dangerous in real case. On the other hand, removal of any wires from the circuit is prohibited, while the switch is ON.

The torque-speed and current-speed characteristics can be visualized when the switch is on. The curves will be changed simultaneously when the loading or external resistance is adjusted.

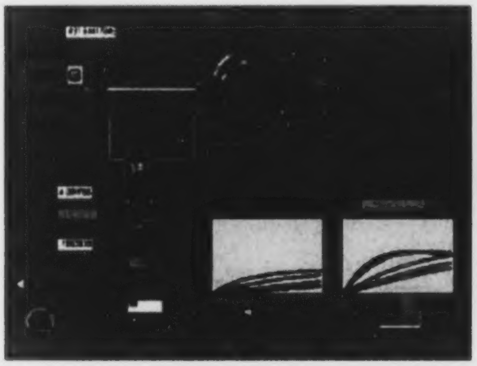

Fig 9: Laboratory 1

Fig 10: Laboratory 2

Fig. 11: Laboratory 3

CONCLUSION

With the discovery learning approach, the package has demonstrated the teaching of some classic theory in an interactive and discovery ways. A real environment would be simulated in the learning package to let the learners explore by themselves. In this approach, graphics, and visual representation play a great important role to stimulate the learner to discover and explore. It package is in use in the teaching of electrical machines in the Higher Diploma courses.

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RESEARCH AND PRACTICE OF HIGHER VOCATIONAL EDUCATION OF ENVIRONMENTAL ENGINEERING

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Index: Higher vocational education, Environmental engineering, Personnel training

Abstract: In China, the environmental protection industry is developing quickly, the environmental engineering education programmes have been forced to try to keep pace, it's necessary to develop the higher vocational education of environmental engineering to meet the demand for a great number correlative persons with comprehensive vocational capability. In this paper, the features of higher vocational education of environmental engineering are discussed. At the same time, the teaching programme establishment and practice of higher vocational education of environmental engineering are set forth also.

INTRODUCTION

Environmental engineering is a rapidly developing field of engineering owing to undefined risks of environmental deterioration and the complex nature of the present environmental problems. Especially in China, with the quick development of environmental protection industry, the demand for correlative technology and administration persons is increasing. Scientific running of environmental protection and environmental heath establishments need technological and practical people who have comprehensive vocational capability and can directly engage in production, service, technology, administration and operation of water supply, urban drainage, wastewater treatment, solid waste collection and handling systems on site. They differ from those academic and designing persons cultivated by usual discipline and teaching system, either differ from higher technology workers or technicians.

FEATURES OF HIGHER VOCATIONAL EDUCATION OF ENVIRONMENTAL ENGINEERING

The American Academy of Environmental Engineering (AAEE,1998) defines environmental engineering as "…the application of engineering principles to the management of the environment for the protection of human health, for the protection of nature's beneficial ecosystems, and for environment related enhancement of the quality of human life". The practical interpretation of this definition is that Environmental Engineers design and oversee the operation of water and wastewater treatment plants and measure and monitor pollutants in the air, on the land, and in rivers and lakes (Alha, et al., 2000). In recent years, the environmental engineering has mushroomed to include all aspects of the human and terrestrial environment systems (Bishop,2000), with increased emphasis on waste minimization, recycling and reuse to minimize the amount of wastes to be managed. At the same time, the education of Environmental Engineers, must be committed to the concept of sustainable development, so that the present society will not endanger the survival of future generations. And the environmental engineering education programmes have been forced to try to keep pace.

Higher vocational education is a new type education mode of personnel training, in which people's capacity is primary (Xu, et al.,1999; Zhao,1999). And it's guided by the requirement of social and economical reality and future development tendency. Which is based on solid speciality knowledge, also needs skills acquired through strict discipline, in the whole process of education teaching and training, we should pay attention to theoretical knowledge while stressing on vocational technology cultivation, and think much of methodology of new knowledge and new skills and edification of social capacity to adapt to changing time and social requirement.

The features of higher vocational education of environmental engineering are accordance with the training goal also. As a main goal, the graduates are to be enabled to work on a technical environmental problem in its entirety. The level they work at is not meant to be highly advanced and scientific, but rather practical and applied. The graduates should have a number of skills such as:

- the ability to oversee the different environmental compartments (water, solid and air),
- capability to apply engineering principles in order to implement technical solutions,
- can directly engage in production, service, technology, administration and operation of water supply, urban drainage, wastewater treatment, solid waste collection and handling systems on site,
- the engineers responsible for the management and quality assurance of raw materials, productsand waste streams in larger industrial enterprises, and
- the willingness for problem-oriented learning and continuing education as working engineers.

In general, high-tech information, high technology and high skills of environmental protection industry development, are basic features of higher vocational education of environmental engineering. Which should be run through the whole education process. The features of higher vocational education of environmental engineering include the following:

- Higher vocational education of environmental engineering is faced to the front line of environmental protection. It cultivates the advanced persons with perfect practical technology and skill needed by vocational post of environmental protection, and the persons with high technology, operation and management ability who can apply and operate environmental pollution treatment establishments, they can skilled work on site as soon as graduated from institute.
- The content of higher vocational education of environmental engineering are mainly mature fundamental theory, technology and administration criterion of environmental protection, its teaching programme and curriculum setting are determined by requirement for vocational capacity and vocational stuff adapting to environmental protection post group.
- Higher vocational education of environmental engineering should promote formation of correlative skills, mastering of technology and cultivation of stuff. Which is achieved through greatly setting and implementing of practice and cultivation curriculum needed by environmental protection vocation post. The setting and study of fundamental curriculum should supply more effective service for environmental protection practice and for achieving cultivation aim of our major.

TEACHING PROGRAMME ESTABLISHMENT OF HIGHER VOCATIONAL EDUCATION OF ENVIRONMENTAL ENGINEERING

Pay attention on training vocational post capability of environmental protection

Before establishing the teaching programme, it's necessary to go to the correlative environmental protection department, environmental health department and enterprises to realize the requirement for post capability. Based on the investigation as above, the staff room establishes the teaching programme, then send to the units to emend and recognize. Finally, the speciality supervise committee discuss and confirm the effective teaching programme.

Insist on the motive consistency of education and environmental protection work

In the aspect of teaching material exploitation and curriculum setting, breaking away from the tie of systematic and integrality of subject education, spanning the frame of curriculum setting in general college. According to the necessary knowledge and capability structure for environmental engineering post, exploiting the curriculum with strong pertinency and synthesis in reason, such as "Running and management of waterworks and wastewater treatment plant", and so on.

Standing out practice teaching

An important aspect of the course is its practical orientation. Which is in according with the recommendations of the German Federal Ministry of Education, Science, Research and Technology (BMBF,1999). When establishment the teaching programme, taking into account the practical training, professional practical placement, and thesis outside the institute, and pay attention to increase the proportion of practice tache, reform the traditional teaching mode that theory and practice was carried out at different time and site, advocate theory teaching combined with experimentalizing. Emphasize the training nature of the teaching method, establish the skill training system for environmental engineering post when establishing the theory system for applying.

Take examination for the target to bring up synthetic qualified personnel

Test paper proposition should fully materialize the feature of higher vocational education that the speciality foundation knowledge is solid and the practice skill is perfect. The test grades can reflect the students' capability level as they really are.

PRACTICE OF HIGHER VOCATIONAL EDUCATION OF ENVIRONMENTAL ENGINEERING

Educational content

In addition to the theory and practice teaching content as above, it's important to carry out vocational moral teaching, which should carry through the whole learning process in order to bring up the persons that love the environmental protection career, with strong responsibility, at the same time, who are good at study and willing to innovate during working process.

Tutors procession

Tutors are the key to realize the teaching programme of higher vocational education. One side, we retain the even-tutors who are accomplished in theory and practice, in addition, we retain the careerman with abundance practice experience and high culture stuff as part-time tutors, in order to make teaching process press close to environmental working practice.

Teaching materials, media and simulation tool

Textbooks and other written text materials and exercises differ from those usual textbooks, which are revised according to the requirements of the higher vocational education of enhancing practical elements. In addition, these basics can be accompanied by supplementary material such as:

a)muti-media, organised such that it can be down-loaded from the Internet; b) slides, photos, videos; c) discussion forum/bulletin board etc.; d) real world project descriptions (cases); e) commercial program links/applications.

Practice site

The practice site at Tongji including:

- Relative production units having assigning co-operation agreement, which can supply practice and discipline site for students;
- Our institute has constituted "Shanghai city construction and administration practice center" (Xie, et al., 1999), the environmental pollution treatment practice room is being built now, which comprehensively embodies combination of mature technology, new technique and new research outcome, is a teaching and practice base having several functions of testing, practice and site simulation.

Professional practical training

The professional practical training of 4 months undertaken during the last semester is compulsory. Public and private institutions, engineering companies, administration, plant operation, consulting firms or authorities, i.e., in the same working areas as the professionals the students are going to join, are expected to employ the students for a nominal salary for practical training (Gujer,2000). We expect that the students will gain insight into the constraints of professional surroundings, will gain motivation for their studies and will improve their ability to get involved in experimental and field work in view of their final diploma thesis. Which is one possibility to make contact with potential employers and to make them aware of potential future human resources.

This period is supervised by a senior engineer, and it is individually followed up by a faculty member. Our tutors will maintain quality control and will assist the students to find reasonable training opportunities. At the end, the students have to prepare oral and written presentations about their work.

The enterprises participating who will employ higher vocational educational graduates

Be sure for cultivating the persons adapting to the front line of environmental protection, we should strive for the employment enterprises participating in and providing support during the whole process of education, such as specialty setting, teaching programme, curriculum content and teaching methods, including supplying teaching instruments, school running money and so on. The board and speciality supervise committee were organized in the Wuxi institute of Tongji University, in order to widely absorb the join of employ units, which achieves good effect.

SUMMARY

The goals of higher vocational education of environmental engineering at Tongji, are cultivating the technological and practical persons who have comprehensive vocational capability and can directly engage in production, service, technology, administration and operation of water supply, urban drainage, wastewater treatment, solid waste collection and handling systems on site. They differ from those academic and designing persons cultivated by usual discipline and teaching system, either differ from higher technology workers or technicians. The level the graduates work at is not meant to be highly advanced and scientific, but rather practical and applied.

The features of higher vocational education of environmental engineering are accordance with the educational goal. The graduates should have a number of skills which are not found in that combination in other engineering disciplines.

The teaching programme establishment and practice of higher vocational education of environmental engineering are determined by its features as above.

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THE USE OF A LABORATORY APPROACH FOR TEACHING ENGINEERING STUDENTS

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Keywords: Experimental research, laboratory based teaching; statistical analysis

Abstract: In this paper, the objective was to investigate the effectiveness of an alternative teaching method – lab-based teaching with a group of sub-degree students. A research experiment was designed, implemented and evaluated. The overall design for this experimental research is based on pretest-posttest model. In the design of this quasi-experiment, much effort was made to reduce the impacts of threats and practical constrains. Details teaching plan and delivery of the teaching are also discussed. At the end of the experiment, all students were examined on the module as part of their final year examination. This is the instrument used to collect students' attainment. Data analysis was carried out to investigate whether there are aspects of significant difference caused by the effect of the lab-based teaching. In conclusion, although there was greater improvement in attainment in the experimental group, it may be due to the initial difference of these two groups. Hence, there is no strong evidence that lab-based teaching is better than conventional teaching for cognitive learning.

1. OBJECTIVES OF THE RESEARCH

Teaching in a large lecture class seems to be successful in many higher education establishments[1,2]. Lectures with student size up to 100 are not uncommon. In this type of type of teaching, lecturers are the only people who do most of the talking in lectures. In fact, many students feel bored in this type of one-way communication. It was felt that some alternatives might be used to enhance the learning outcome of the students at Hong Kong Institute of Vocational Education (HKIVE) [3,4].

This study tries to achieve the following objectives:

1. To evaluate the effectiveness of lab-based teaching by carrying out a research experiment on two groups of students and study the difference of outcomes.
2. To determine whether lab-based teaching can be an alternative to conventional classes.
3. To identify any practical problems associated with lab-based teaching and suggest ways to tackle them.

2. METHODS AND TECHNIQUES

A research experiment was set up such that a group of students was divided into two sets. Half of the class took the traditional approach while the other half took the lab-based approach on an engineering module. The time-span of the experiment was one term (15 weeks). At the end of the experiment, all students were examined on the module as part of their final year examination. This is the way the experimenter measured the student's attainment in that module. In addition to the examination, careful experimental design was done to assess the learning outcomes of students and evaluate the effect of the teaching of two different approaches.

The main emphasis in this paper is the design experimental research and its evaluation. This experiment is a useful approach for analysis the effectiveness of lab-based teaching.

3. OVERALL DESIGN PLAN

Multi-groups model is being one of the most robust techniques for the design of an education research. Due to the limited resources, researcher has to compromise in which he/she has to trade threats to practicality.

The overall design for this experimental research is based on pretest-posttest model. It is commonly used in educational research. Usually, the requirements of pretest and posttest model require initial randomized group. For administration requirement, quasi-experimental research was carried out without the initial random assignment.

In the design of this quasi-experiment, much effort was made to reduce the impacts of threats and practical constrains. In this experiment, 38 students had been grouped into two tutorials groups. Tutorial Group A had 18 students while Group B had 20 students. It was more convenient simply to carry out the experiment without re-grouping these students.

Because of the time-tabling constraint, it was decided Group A would have conventional teaching while Group B would go through the lab-based teaching. That is Group B is the experimental group while Group A is the control group (Table 1).

Tutorial Group	Group	Student Gp Size
A	Control Group	20
B	Experimental Group	18

***Table 1**: Grouping of the students*

4. THREATS TO THE EXPERIMENTAL DESIGN

The overall design of the research consists of the following steps and it can be depicted in Figure 1. The pitfalls of the design come from the lack of initial randomization of participants to form two equal groups, that is, the two groups may not be equal before the experiment is implemented. The main threat to the design is the possibility that group differences on the posttest are due to initial differences rather than the treatment. In many education researches, it may not be possible to choose the "best" designs due to practical constraints. The quasi-experiment mentioned above seems to be the most "suitable" design. As will be shown in section 9, the technique of analysis of covariance is used to handle this problem.

	Time →	→	→
Group under investigation	T1	*X*	T2
Control Group	T1	*Y*	T2

Where T1 : pretest
T2 : posttest
X : lab-based teaching
Y : conventional teaching

Figure 1: Overall design methodology

Subsequently, the null hypothesis of the research is proposed - the mean examination score for students with lab-based teaching is equal to the mean examination score for students with conventional teaching. That is:

$$H_o : \mu_x = \mu_y$$

where H_o : the null hypothesis

μ_x : mean attainment score of students with treatment X (i.e. lab-based teaching)

μ_y : mean attainment score of students with treatment Y (i.e. conventional teaching)

The implementation of experiment can be summarized as the following steps in Table 2:

Step	Task	Details implementation
Step 1	Theory	Student attainment can be affected by different modes of teaching (dependent variable = teaching methodology independent variable = student attainment)
Step 2	Hypothesis	The hypothesis is defined with the characteristics "teaching methodology" with the level of attainment. When the level of attainment is understood to be unrelated to other factors, this can also decided their causal relationships.
Step 3	Main Operations	Experimental design – development of the quasi-experiment
		Delivery of both conventional and lab-based teaching to different groups of students
Step 4	Collect observation	Tabular the attainment score from pretest and posttest results from students' examinations.
Step 5	Data analysis	Apply data analysis techniques to investigate the relationship between the dependent and independent variable.
Step 6	Inference	Draw conclusions on the hypothesis from the data analysis. Examine the attainment level and change of attitude Infer possible causal cause-effect relationships.

***Table 2**: Summary of implementation of the experimental research*

5. TEACHING PLAN

Once the experimental design framework had been set up, detailed teaching plans for the lab-based teaching were made to accommodate the delivery of syllabus based on the objectives of the module. The details can be shown in Table 3 with comparison of the conventional teaching and lab-based teaching.

Teaching Plan of conventional teaching class (for Control Group)	Teaching Plan of the lab-based class (for Experimental Group)
The following strategies that should be used in teaching conventional class (Lecture) The use of conventional lecture The use of tutorial style for helping student to dissimulate and solve problem The following strategies that should be used in teaching conventional laboratory class. These were the normal standard practice for laboratory. Emphasis of skill based learning in which students learn the basic skills for equipment operation that re-enforcement of theory.	The following strategies that should be used in teaching lab-based class The use of discovery teaching tactics The including of problem solving activities within the laboratories Emphasis of student involvement in open-ended laboratory exercises The laboratory is divided into many laboratory sessions that cover all the topics mentioned in the syllabus. For each laboratory, it is followed by exercises. This can reinforce a particular concept. Coverage of the related theory is provided leading up to each exercise. Unlike the conventional procedure used in lecture, the students are expected to learn the theory intuitively.

***Table 3**: Comparison of teaching strategies between conventional and lab-based teaching*

6. DELIVERY OF THE TEACHING

After careful study, the module entitled "Discrete-time Signal Processing" (DSP) was chosen. The module is a third-level course for students of Higher Diploma in Communications Engineering. Before the commencement of the research experiment, a series of lab-based teaching materials were prepared [5,6]. Many efforts were made to ensure teaching is relevant and the attainment is comparable to that of conventional teaching. In the design of the laboratory teaching, the ethical issues have been considered. It is hoped that the impact can be reduced in case lab-based teaching proved to be a failure.

Table 4 shown below compares the teaching plan of conventional and lab-based teaching. It is noticed that the amount of contact hours of these two methods is comparable.

Teaching plan of the conventional class		**Teaching plan of the lab-based class**	
The teaching plan to satisfy the above syllabus is as follows:		The teaching plan to satisfy the syllabus is as follows :	
2-hour lectures	x 8	3-hour laboratory-based class	x 8
2-hour tutorials (for a short test, and revision before examination)	x 2	2-hour tutorials (for a short test, and revision before examination)	x 2
3-hour laboratory	x 3		
Total	29 hours	Total	28 hours
• Each of the lectures is covered in lecture room. The teaching consists of • 15 mins of reviews of topics covered in last sections • 20-30 mins to cover the each of the main topics • Re-enforcement of the topics by solved examples. • Conclusion at the last 5 mins.		• The integrated lab-based teaching consists of • 15 mins of reviews of topics covered in the last sections • 20-30 mins of introductory topics and overview of the difficult concepts that • Allow time for students for laboratory exploration using computer. • At the last 15 mins, short quiz to probe student understanding of the topics.	

***Table 4**: Comparison of overall teaching plan of teaching sessions of the two methods*

7. MEASUREMENT OF THE COGNITIVE OUTCOMES - PRETEST AND POSTTEST

In this experimental research, students' examination results were used as their pretest and posttest scores. Although it is very difficult to have reliable pretest score that can exactly identify students' attainment before the commencing the experiment, it is necessary that we have to make the assumption the pretest is valid and it can produce a set of reliable data.

Precaution has been made to alleviate the possible problems. The pretest score can be obtained from results of the pre-requisites unit "Signal in Systems". It was the examination result of students in their 2nd year. There are many factors that can affect the reliability of this data after 8 months. It was later decided the pretest score was extracted from the examination result another module "Information Systems" taught by the author. Although the result from this examination cannot guarantee the pretest is actually measuring the learning attainment in the experiment module, it does certainly reflect the students' general ability to comprehend technical content in a related area.

At the end of the experiment, posttest was designed to measure the cognitive outcome. Since all students were examined on the module as part of their final year examination, the examination score is used as posttest result. It is a natural choice as the examination supposes to measure students' attainment of the module. To moderate the validity of the instrument to measure posttest result, the examination paper had gone through the normal procedures of internal and external moderation within the EE department.

8. ANALYSIS OF STUDENT'S COGNITIVE OUTCOMES

Data shown in the following tables indicate the elementary result of students' cognitive outcomes. Table 5 is the descriptive statistics of the module "Information System". This is a technical module taught in the first term (i.e. before the experiment). Note that the only the examination result was used as the pretest score. Data in Table 6 shows the continuous assessment and examination result of module "Digital Signal Processing". Again, the examination score is used as to measure students' attainment. The posttest result show the average attainment score of students in Group B (experiment group) is 55.5% while it is only 50.2% for students in Group A (control group). Note that also the pretest result (average) of Group B is 57.1% which is slightly higher the average score of Group A (54.5%).

Unit code : EE315	**Group A – control group**		**Group B – experiment group**	
Title : Information systems	Average	Standard Deviation	Average	Standard Deviation
EXAM (pre-test)	**53.7**	**8.8**	**61.1**	**6.2**
CA	52.8	11.5	62.1	9.0
Total	54.5	5.9	57.1	5.5

***Table 5**: Descriptive statistics of pretest score*

Unit code : EE351	**Group A – control group**		**Group B – experiment group**	
Title : DSP	Average	Standard Deviation	Average	Standard Deviation
EXAM (post-test)	**50.2**	**13**	**55.5**	**12**
CA	48.0	9	51.0	9
Total	49.5	11	54.2	11

***Table 6**: Descriptive statistics of posttest score*

From the descriptive statistical data shown Table 6, one can say Group B (55.5 marks) is better than Group A (50.2 marks) after the experimental treatment. There are many possible reasons that can cause students with such better learning attainment. Reasons such as statistical variations, initial difference of the groups, experiment treatment cannot be ruled out. It is necessary to carry out further data analysis to examine the causes of the difference. The data are evaluated using Statistical Package for Social Science (SPSS)[7,8].

The computer printout of Figure 2 shows the posttest results of the two groups of students; these are Group 3 (control group) and Group 4 (experiment group). The next part of the output shows the *t*-test itself. It shows that the group sizes and the groups had comparable means (i.e. 50.2778 and 55.4500 respectively). The standard deviation is 13.38 and 12.12 respectively. Using the pooled variance estimate, the *t*-value is –1.25. The negative sign arises simply because of the order of listing the groups and is not of itself of any significance. The *t*-value is 1.25 and it has a probability of 0.219. That is the probability of these set of data are drawn from the same population is 0.219. We can say it is likely that the difference of the mean of these two groups (i.e. 50.2778 and 55.4500) is due to statistical variation. From the initial analysis, the null hypothesis H_o is **accepted**.

$$H_o : \mu_x = \mu_y$$

Where H_o : the null hypothesis

μ_x : mean attainment score of students with treatment X (i.e. lab-based teaching)

μ_y : mean attainment score of students with treatment Y (i.e. conventional teaching)

```
t-tests for independent samples of  GP


                              Number
        Variable            of Cases    Mean        SD        SE of Mean
      ---------------------------------------------------------------
        EXAM (posttest)

       GP 3  (control)       18       50.2778     13.389        3.156
       GP 4  (experiment)    20       55.4500     12.120        2.710
      ---------------------------------------------------------------

       Mean Difference = -5.1722

       Levene's Test for Equality of Variances: F= .003   P= .956


     t-test for Equality of Means                                 95%
  Variances  t-value   df    2-Tail Sig    SE of Diff      CI for Diff
  -----------------------------------------------------------------------
  Equal      -1.25     36          .219          4.138       (-13.565, 3.221)
  Unequal    -1.24     34.52       .222          4.160       (-13.619, 3.275)
  -----------------------------------------------------------------------
```

***Figure 2** : Data analysis using SPSS – t-test of posttest result*

Figure 3 shows pretest results of the two groups of students; these are Group 1 (control group) and Group 3 (experiment group). The next part of the output shows the *t*-test itself. It shows that the groups had the means 53.7222 and 61.0500 respectively. Again, using the pooled variance estimate, the t-value is 2.99. It has a probability of 0.005. That is to say it is unlikely (0.5%) these samples are drawn from the same population. We can conclude these two groups were not initially equal. It is necessary to carry out further analysis to take into consideration of un-equal groupings.

```
t-tests for independent samples of  GP


                              Number
        Variable            of Cases    Mean        SD        SE of Mean
      ---------------------------------------------------------------
        EXAM - pretest

       GP 1 (control)        18       53.7222      8.837        2.083
       GP 2 (experiment)     20       61.0500      6.160        1.377
      ---------------------------------------------------------------

       Mean Difference = -7.3278

       Levene's Test for Equality of Variances: F= 2.107  P= .155


     t-test for Equality of Means                                 95%
  Variances  t-value   df    2-Tail Sig    SE of Diff      CI for Diff
  -----------------------------------------------------------------------
  Equal      -2.99     36          .005          2.451       (-12.299, -2.356)
  Unequal    -2.93     29.99       .006          2.497       (-12.429, -2.227)
  -----------------------------------------------------------------------
```

***Figure 3** : Data analysis using SPSS – t-test for the pretest result. (note that there is initial difference between two group of student before experiment)*

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9. ANALYSIS OF COVARIANCE

Data analysis shown in Section 8 indicates the initial grouping (not random assignment) does not produce groups with equal pretest means. It is not the deficiency of the design of the experiment. In many cases, random allocation does not guarantee it produces equal groups at the start especially if group size is small.

As shown in section 8, *t*-test is useful to find whether the means of two groups differed significantly. But it is also necessary to compare the difference of pre-test and post-test score of two different groups of students. *Analysis of variance* is useful as it takes consideration of initial difference. The one-factor analysis of variance (ANOVA) procedures is used because there is just one independent variable and one dependent variable. Details of the analysis is shown in Figure 4.

```
Variable  EXAM
   By Variable  GROUP

- - - - -  O N E W A Y  - - - - -

      Variable  EXAM
   By Variable  GP      (1=pretest-control; 2=pretest-experimental;
                         3=posttest-control; 4=posttest-experimental)

                                   Analysis of Variance


                                      Sum of          Mean              F       F
        Source              D.F.     Squares         Squares          Ratio   Prob.

Between Groups                 3     1160.5094       386.8365         3.5314  .0190
Within Groups                 72     7887.1222       109.5434
Total                         75     9047.6316
```

Figure 4: *Data analysis using SPSS – analysis of variance for four groups*

The first part of the computer printout shows an *F*-test on the data. The *F*-ratio, the ratio between groups is 3.5314 with low associated probability (0.019). This is the low probability indicates that it is unlikely that the groups come from the same population.

In order to determine the effect of each of the variables and their joint effect on achievement of students, and analysis of variance was used which is shown in Figure 5.

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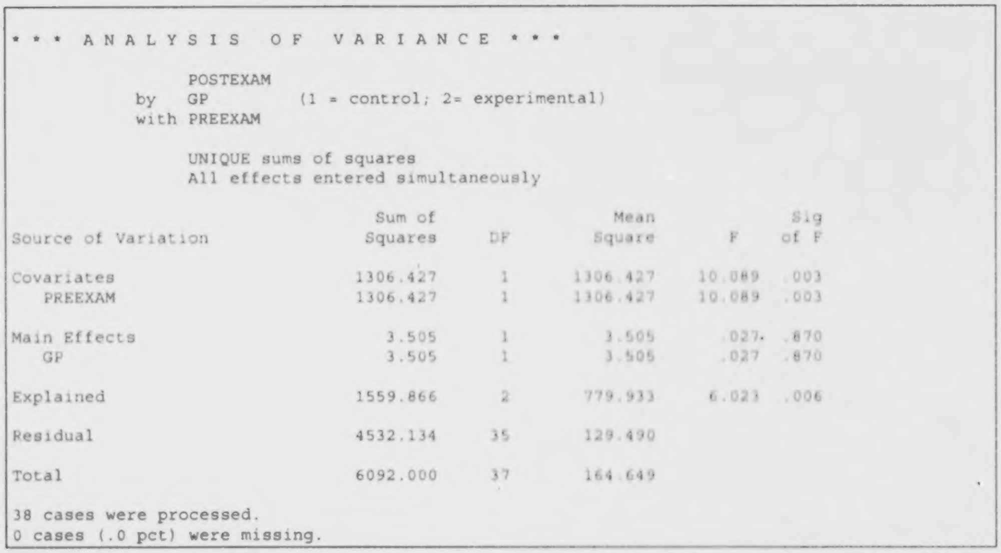

```
* * *  A N A L Y S I S   O F   V A R I A N C E  * * *

                POSTEXAM
        by      GP          (1 = control; 2= experimental)
        with    PREEXAM

                UNIQUE sums of squares
                All effects entered simultaneously

                              Sum of                Mean            Sig
Source of Variation          Squares      DF      Square        F   of F

Covariates                  1306.427       1    1306.427   10.089   .003
   PREEXAM                  1306.427       1    1306.427   10.089   .003

Main Effects                   3.505       1       3.505     .027.  .870
   GP                          3.505       1       3.505     .027   .870

Explained                   1559.866       2     779.933    6.023   .006

Residual                    4532.134      35     129.490

Total                       6092.000      37     164.649

38 cases were processed.
0 cases (.0 pct) were missing.
```

Figure 5 : Data analysis using SPSS – analysis of variance for2 groups (with pretest scores as the covariates)

The output shows a fairly high F-ratio 10.089 with a significance value of 0.003 for pre-exam score differences between the groups. It is highly unlikely ($p < 0.003$)that the groups of students were equal at the start of the research experiment. The next part of the output shows an F-ratio of 0.027 ($p < 0.87$) for the effects of teaching group on the posttest scores after correction for unequal value of pre-test. That is, after correction, the two teaching methods (conventional and lab-based) were statistically equal (i.e. 87%). As far as cognitive outcome is concern, with the consideration of unequal pretest score, the null hypothesis ($H_o : \mu_x = \mu_y$) is **accepted**.

10 SUMMARY

In this investigation, an experimental research was implemented to evaluate the effectiveness of lab-based teaching with respect to conventional teaching. The design for this research experiment is the “grouping-pretest-treatment-posttest” method. The different teaching methods were implemented using a one-term module known as “Digital Signal Processing”. The implementation of the syllabus was completed using these two different teaching approaches.

During the experiment, measurements of students’ attainment and attitude are collected. Data analysis was carried out to investigate whether there are aspects of significant difference caused by the effect of the lab-based teaching. Although there was greater improvement in attainment in the experimental group, it may be due to the initial difference of these two groups. Hence, it is concluded that there is **no strong** evidence that lab-based teaching is better than conventional teaching for cognitive learning. The data analysis of students’ attitude also indicates there is no evidence that the change in students’ perception is the result of the lab-based teaching.

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THE PRACTICE FIRM CONCEPT
– A COMPETENCY APPROACH TO TEACH KEY BUSINESS SKILLS

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Index: Action-learning, Assessment, Business, Competency-based, Employability, Simulation

Abstract: Whether it is called "Core Skills (UK)"; "Employability Skills (Canada)"; "Essential Skills (New Zealand)"; "Workplace Know-how (USA)" or "Project and Transfer Oriented Training (Germany)", globally we have been concerned with integrating key competencies with learning outcomes to provide the workforce with potential employees that are employable in day one. The Department of Business Administration, HKIVE (Tsing Yi) supports this view by incorporating "the Practice Firm Concept" into course delivery, with the belief that it enhances the quality of teaching and fosters life-long learning skills. The purpose of this paper is to illustrate how this Concept has been developed and incorporated in our business curriculum.

BACKGROUND

On a fact-finding tour to Australia in November, 1998, the Department of Business Administration, IVE (Tsing Yi) came across an innovative teaching and learning approach in business education called the "Practice Firm" Concept which blends practical work experience with theoretical learning. The Department has incorporated this approach into its final-year project because of its value as a stepping stone between classroom learning and the real world of business.

As part fulfillment of the Higher Diploma curriculum, our final-year students are required to undertake a group project in the final year and to submit a collective report on group effort. This project is an important learning activity, which serves as the integrative vehicle of the different components of the course. It has several educational functions regardless of the kind of work that students will enter into after graduation.

1. It provides a practical learning experience in which students can integrate and apply their knowledge with emphasis on solving practical business problems using the skills and knowledge acquired from different sources and disciplines.
2. It provides preliminary training for those students who intend to pursue further studies. This involves not only the implementation of research methods but also the ability to learn to manage a project in an independent manner.
3. If the student does not intend to pursue further studies, the skills acquired in project work will be valuable in all kinds of independent investigation and report writing in the workplace.

WHAT IS A PRACTICE FIRM?

A Practice Firm is a simulated business that is set up and run by students with the support from a teacher trained in facilitation techniques and a Mentor Organization (called the Business Partner Firm). The students buy and sell products or services on a local, national or international basis among practice firms within a closed market economy.

The products and/or services offered by the Practice Firm reflect those marketed by the Business Partner Firm. Although there is no actual transfer of goods or money, all the usual business transactions involved in setting up and running a practice firm needs to be considered:

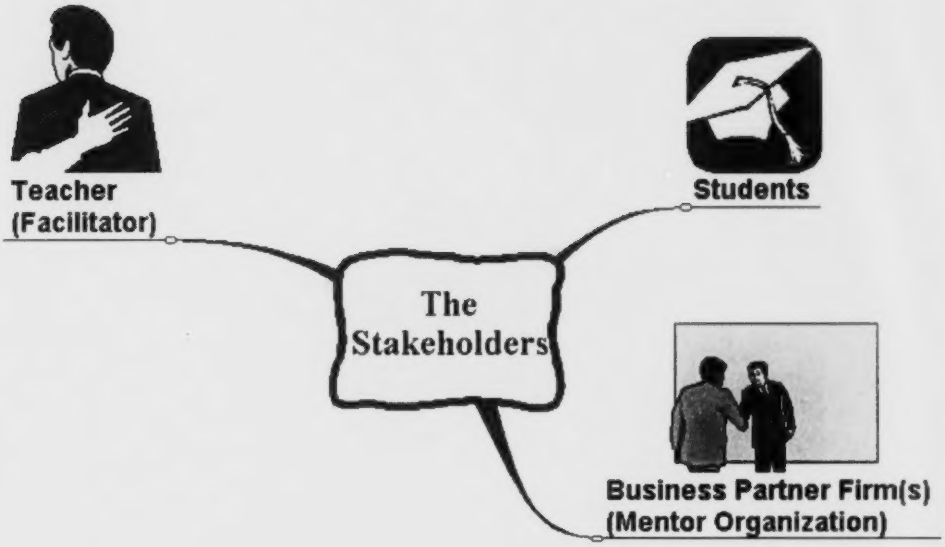
- writing a business/departmental plan;
- identifying the range of products/services;
- producing a price catalogue/list;
- selecting/enhancing a business name;
- designing/enhancing a business logo;
- drafting/enhancing a mission statement;
- designing an organizational structure that would suit your practice firm;
- form departments by identifying appropriate business functions within the simulated business, e.g., maintaining financial records, preparing a budget, market research, human resources management, marketing; and
- other business activities.

Practice Firms can be established in any line of business. At present, the HKNPF has seven businesses, they are

Creative Era	Creative Era Public Relations Company (Public Relations & Event Management)
YKPF	Yau Kee Transportation Co. Ltd. (Local Transportation Service)
Bha	Brilliant Hair Accessory Co. Ltd. (Wholesale Retailing)
Ex	ExSpeed Logistics Co. Ltd. (Consumer Logistics Service)
DINO	DINO Co. Ltd. (Retail - Purchasing & Logistics)
TIPS	Tips Computer Co. (Computer Retail, Assembly & Maintenance)
	Sonic Printing Group (Printing)

Like any economy, diversity is encouraged.

THE STAKEHOLDERS



The Students

Students become "employees" of the Practice Firm and they work within legal guidelines and other regulations that are imposed on a real firm, such as those relating to company registration, copyright, occupational health and safety, equal opportunity matters, etc. This provides opportunities for students to experience realistic business activities and develop problem-solving and decision-making skills in a variety of business situations.

Students are encouraged to plan, research, develop and trial a range of procedures and processes. They reflect on the content and nature of their learning through this hands-on approach with guidance from the teacher. They work in teams to develop their interpersonal skills. They also learn to solve problems and take ownership of both mistakes and successes.

The Practice Firm is a learning environment that is managed by the students. This is how they learn best about business – by doing it! They learn about what they need to do to keep the business running. They gain skills in managing the business while they are also learning how to learn. The experiences in a Practice Firm will help students to learn about their own skills and interests, and give them confidence in planning a career path.

The Business Partner Firm

(Mentor Organization)

A relationship with a Business Partner Firm, a real business, is developed to keep the Practice Firm in touch with the real economy and real business processes. The Business Partner Firm acts as a mentor for the Practice Firm and provides advice and support to students.

Students may have established an arrangement with the Business Partner Firm that includes

- using the business partner firm's products and/or services for simulated trading purposes and promotion within the practice firm networks;
- visiting the business partner firm's business site;
- providing business information , e.g., procedural manuals, policies, etc.;
- providing industry placements; etc.

The Teacher
(Facilitator)

Real work environments do not have theory sessions so lecturing or teaching activities do not fit in the simulated workplace! Teachers adopt the role of "facilitators" by guiding, mentoring, suggesting and coaching students in their work.

RATIONALE FOR THE PRACTICE FIRM CONCEPT

HKNPF

Hong Kong Network of Practice Firms

(http://www.hknpf.vtc.edu.hk)

In order to prepare students for working effectively in the 21st century, the learning environment must replicate the workplace in its use of technology, work arrangements and business goals. The Hong Kong Network of Practice Firms (HKNPF), which is located within our Department, plans to implement e-commerce principles to ensure that students are familiar with up-to-date business processes and test the implications of on-line internet-based business operations.

In this near-real workplace environment, students can acquire and develop skills (adapting to changing demands of the job, carrying responsibility, work attitudes, etc.) that are otherwise not possible in the traditional classroom. One only needs to browse through the Classified Section of newspapers or job search web sites to be convinced of the importance of the personal characteristics and attitudes desired by employers.

CONCLUSIONS

The Practice Firm Concept provides an action-learning environment whereby

- students can acquire employability skills while pursuing a specialized field of study which in turn enhances their employment prospects;
- a framework is established between the business community and educational institutions so that they can exert mutual influence over what employers wants in their prospective employees and what schools and colleges need to be incorporating in the curriculum;
- teachers are made aware of the need to revise their teaching and learning strategies that will help students to acquire employability skills such as positive work attitudes, good work habits, practice ethical behaviors, accept responsibility, and working with others; and
- academic and technical excellence is "generally useless if they cannot be coupled with the employability skills necessary to survive in the business world." (Wentling, 1987:316)

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BENCHMARKING IN SUPPLY CHAIN MANAGEMENT: A PROCESS TO FIND A BETTER WAY, RATHER THAN AN ATTEMPT TO REINVENT THE PROVERBIAL WHEEL

Eric Y. L. Tam
Hong Kong Productivity Council

Index: Benchmarking, Organisation Learning, Supply Chain Management

Abstract: In searching for "best practices" in Supply Chain Management, the Asian Benchmarking Clearinghouse (ABC) of Hong Kong Productivity Council (HKPC), jointly with Hong Kong Article Numbering Association (HKANA), conducted a consortium benchmarking study.

Through systematic data collection and site visit processes, the consortium group gained critical insights into key issues, challenges and solutions. More importantly, the participated companies were able to identify their positions in the marketplace that were essential for goal setting and attaining superior performance.

The Hong Kong Productivity Council shares a same benchmarking methodology with its global alliance partner, American Productivity and Quality Center (APQC). The approach was developed in 1993 and has been serving as one of the premier methods for successful benchmarking in the world.

I INTRODUCTION

Benchmarking is a process of improving performance by continuously identifying, understanding, and adapting outstanding practices and processes found inside and outside the organization. Many Fortune 500 companies and other large organizations have embraced benchmarking as an important, systematic methodology for achieving the organization's strategic objectives.

A 1995 research study conducted by the American Productivity & Quality Center's (APQC) International Benchmarking Clearinghouse demonstrated benchmarking's tremendous leverage. More than 30 organizations reported an average US$76 million first-year payback from their most successful benchmarking project. Among the most experienced benchmarkers, the average payback soared to US$189 million.

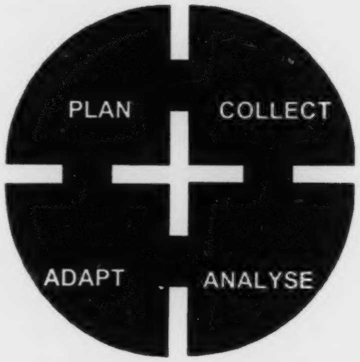
Benchmarking's positive influence extends beyond improving a particular business process. It also promotes the emergence and evolution of a "learning culture" throughout the enterprise-a key to continuous improvement, total quality, and competitiveness over the long term.

II BENCHMARKING METHODOLOGY

The Hong Kong Productivity Council shares a same benchmarking methodology with its global alliance partner, American Productivity and Quality Center (APQC). The approach was developed in 1993 and has been serving as one of the premier methods for successful benchmarking in the world.

HKPC uses a four-phased approach in conducting consortium benchmarking study, i.e. planning, data collection, data analysis and reporting, and adaptations of study findings.

Figure 1: HKPC's consortium benchmarking studies use a four-phased approach: study planning,



data collection, data analysis and reporting, and adaptations of study findings

Plan

During this phase the specific study focus area, key measures and definitions are established and clearly documented. Additionally, the data collection tools are refined and finalized, and research is conducted to identify the best-practice organizations to study.

Collect

This phase has two distinct objectives: 1) collect qualitative data, and 2) learn from the best. The study questionnaire is administered to all participants, and the site visits are conducted at selected best-practice organizations.

For sits visits, best practice partners receive the list of questions to be asked prior to the site visit to ensure a smooth, productive, and efficient learning experience. Participants can send a representative to at least two site visits, where both qualitative and quantitative information is collected. Participants receive a report from each site visit, whether they attend or not.

Analyse

Key activities during this phase include analyzing trends and identifying practices that enable and hinder superior performance. The study team presents a final report containing key findings and insights at a Knowledge Transfer Session. At this concluding meeting of the study, the sponsors discuss the key findings in depth and have an opportunity to interact with each other and the best-practice organizations through systematic networking activities and presentations. The study team facilitates participants' initial action plan development to adapt and implement what they have learned.

Adapt

Adaptation and improvement resulting from the best practices identified throughout a consortium study occur after the study participants take the learnings back to their organizations.

III BENCHMARKING INTO ACTION

Due to the emerge of new information technologies, globalization of operations and markets, increasing pressure from customers on responsiveness and reliability, Supply Chain Management (SCM) has become at once a challenge and an opportunity. In view of Supply Chain Management has become one of the core competitive advantages for many companies, the Asian Benchmarking Clearinghouse (ABC) of the Hong Kong Productivity Council (HKPC) jointly with the Hong Kong Article Numbering Association (HKANA) conducted a Supply Chain Management benchmarking consortium study in 1999.

`. This process resulted in the compilation of a list of site visit candidates. Each site visit candidate was contacted and asked to participate in a screening interview. Based on the results of the interview, as well as company availability, the HKPC study team confirmed site visits with eight candidates.

Phase 2: Collect

The HKPC study team collected data from the "best practice partners" and participating companies via two separate data collection tools:

i) *Detailed Questionnaire:* quantitative questions designed to collect objective and quantitative data.

The first part of the detailed questionnaire was based on the questionnaire used in the Global Logistic Research Project of the Michigan State University. The second part of the questionnaire was structured around 10 supply chain improvement concepts which were grouped under 2 focus areas: Supply Management and Enabling Technologies.

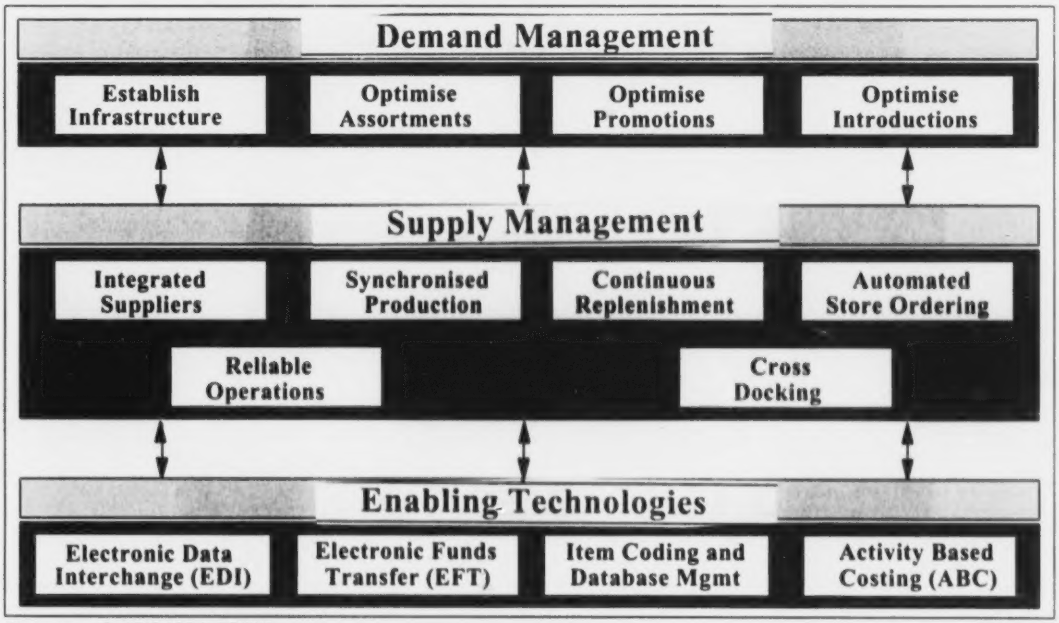

Demand Management
Establish Infrastructure
Optimise Assortments
Optimise Promotions
Optimise Introductions
Supply Management
Integrated Suppliers
Synchronised Production
Continuous Replenishment
Automated Store Ordering
Reliable Operations
Cross Docking
Enabling Technologies
Electronic Data Interchange (EDI)
Electronic Funds Transfer (EFT)
Item Coding and Database Mgmt
Activity Based Costing (ABC)

Figure 2: Supply chain improvement concepts (Source: The Official Supply Chain Management Scorecard, HKANA 1998)

For each improvement concept, participants were asked to self assess their current practices by using a scorecard.

For example, the target of Cross Docking is to eliminate non-productive inventory held at retailer and wholesaler Distribution Centres (DCs). By eliminating storing of products at retailer DCs, the merchandise received at the warehouse or DC is not put away, but turned around for shipment to retail stores, typically with 24 hours. Benefits stem from reducing time and cost to move products into and out of warehouse locations, including associated data entries into inventory management information systems.

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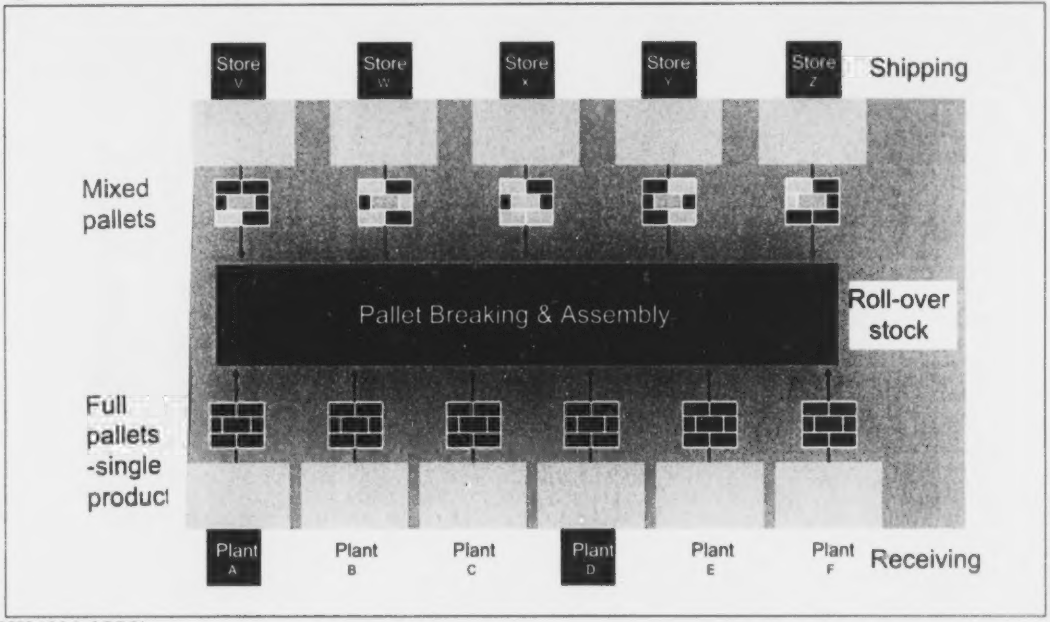
Figure 3: The concept of Cross Docking (Source: The Official Supply Chain Management Scorecard,


Store V
Store W
Store X
Store Y
Store Z
Shipping
Mixed pallets
Pallet Breaking & Assembly
Roll-over stock
Full pallets -single product
Plant A
Plant B
Plant C
Plant D
Plant E
Plant F
Receiving

HKANA 1998)

By using the scorecard, the participants assessed their maturity level on two aspects: (1) Assessment, i.e. the ability determine whether cross docking/flow through should be carried out and if so which sort of cross docking/flow through is appropriate for the category and supply chain under consideration); (2) Implementation, i.e. the transfer of inward deliveries of any kind from the zone of reception directly to the zone of delivery with only limited or no interim storage at all).

The results of this study revealed that the consortium group made significant efforts on both self-evaluation and trial implementation, with at least few selected suppliers. However, a large-scale implementation was limited in Hong Kong.

ii) Site Visit Discussion Guide: qualitative questions designed to collect qualitative information about targeted aspects of supply chain management. To collect these data, the best practice partners offered half-day "site visits," allowing participants to meet with them and share their implementation practices.

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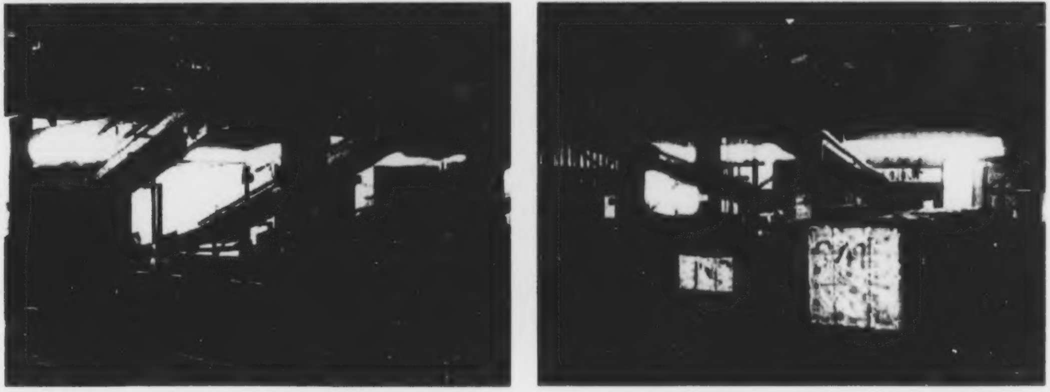
Figure 4: Cross Docking in a US best practice partner's site



Phase 3: Analyse

The HKPC study team analysed both the quantitative and qualitative information gained from using the data collection tools. The analysis focused on identifying innovative practices and methodologies for Supply Chain Management implementation. Analysis of participants' data formed the basis of the final report.

Phase 4: Adapt

In January 2000, the HKPC and HKANA study team presented key findings of the study to both sponsors and partners of this initiative. All participating organizations received a copy of the final report, which showcased critical success factors identified through the research and site visit processes. Participants use this report to begin adapting the use of successful implementation strategies within their organizations.

IV CONCLUDING REMARKS

Through a systematic data collection process and site visits, the SCM consortium group in Hong Kong gained critical insights into key issues, challenges and solutions. More importantly, they were able to identify their positions in the marketplace that were essential for goal setting and attaining superior performance.

The project has clearly demonstrated Benchmarking is a powerful tool for identifying best and innovative practices and for facilitating the actual transfer of these practices. It also shows that Benchmarking is a positive, proactive, structured process that leads to changing operations and eventually attaining superior performance and a competitive advantage.

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VOCATIONAL EDUCATION AND TRAINING FOR HONG KONG INTO THE 21ST CENTURY :
AN INVESTIGATIVE REPORT

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Abstract: Demands from the 21st century customers will change fundamentally from that of past years. This article attempts to review the traditional strength of Hong Kong economy and its people's ability to meet with these new demands. Vocational Education and Training plays an important role in the provision of human resources. In this article the concept and methodology for "Shaping the 21st century worker" is proposed. The main issue being investigated is to provide workers with knowledge and ability, not just to cope with skills and knowledge require for their related field of work, but also the ability to control their work organization and to shape and design new methods / processes for new generations of products and services. Occupational-related didactics, alongside with their methodological implications and applications are also investigated. It is proposed that project based learning type of education and training are needed to be developed and implemented for various "professional profiles". The requirements of the new age VET trainer to suit the changing needs of service / industry are also discussed.

An initial investigative report.

1. INTRODUCTION

Over the past two decades, especially in the western world, the development of technology in the transformation of materials into consumable products and service has been rapid. As a result great wealth has been created, the average people in the western world owns much more than their predecessors. It is a social norm that when peoples' basic needs are satisfied then their aspiration to satisfy their ego needs will increase. Thus product functional quality alone will not be enough, product variability and fashion have become extra dimensions in their quest for products to be consumed. This consumer led phenomenon reflects the demand on the modern manufacturing and service industry as a whole. Product quality and reliability, product variability, short product life cycle, product availability on short notice and at the right cost are all necessary characteristics of a desirable consumable product. As a result the traditional system of mass production and monotonous type of service with adequate functional quality and lowest production costs is no longer compatible to current consumer demands. Modern system that incorporates production and service of high variety, quality to customers' specification and flexibility of switching product types almost instantaneously are required. On top of this there is also the factor of cost. Although the lowest cost to the consumer is not necessary the most desirable factor in a consumable product, however the lowest production cost will allow a much higher degree of pricing flexibility and the possibility of a higher profit margin. This important factor has become indispensable in an increasingly competitive commercial market for desirable consumable products.

Development of Hong Kong Manufacturing and Service Industry.

The strategic location of Hong Kong in the Pearl River Delta and the post Second World War years of political and economical turmoil in mainland China contributes greatly to the rapid development of manufacturing industry in Hong Kong. Until 1987 the local manufacturing industries are the biggest contributor to the Hong Kong GDP.

Since the creation of special economic zones in Shenzhen and Zhuhai by the Peoples' Republic of China, many local manufacturing industries have started to move most of their production processes to these areas and the surrounding townships. The main reasons are to enjoy conditions such as cheap labour costs, special tax relief and much less stringent regulations in pollution control, fire prevention and industrial safety. What is left behind are functions such as procurement of materials, sales and marketing, design and product development, technical support, production planning and control, quality control, packaging and logistics.

Manufacturing and service industries in Hong Kong are now facing increasing competition from other developed and developing countries. The emergence of new market environment requires products and services not only of high quality, but also with much higher degree of variety and ever reducing product life cycle. Thus the ability to design innovatively, to manufacture and provide products / services flexibly and speedily with very low level of inventory will be of paramount importance. Hong Kong industries have to gradually adapt changes from its traditionally labour-intensive operations to update and upgraded their technology and management techniques.

Meanwhile manufacturers in mainland China will continue to develop, whilst utilizing its abundant resources in terms of labour, land and materials, there is still a lot of room for improvement on areas such as technical support services, manufacturing management and administration. The performance of the economies of Hong Kong and Southern China is so intertwined that it would be unrealistic to do planning without taking into account of the other. With Hong Kong revert to Chinese sovereignty in 1997, it is apparent that both service and manufacturing industries of both regions are starting to co-operate and grow, gradually integrate and merge as one. To sustain such continuous growth of the combined economies, there will be substantial demand for technical support in providing the technological know-how.

The objectives identified by the "Made by Hong Kong" report (Berger et al 1997) does bear considerable significance as guidelines for future Hong Kong industrial development.

That is -

1. Transformation of current production system by identifying the best practices of good companies as well as targeting the strengths and weaknesses of a system as a whole.
2. Concentrate not only at high technology industries (e.g. biotechnology, information technology, and electronics), but also at core industries, by understand how new products combining manufacturing skills and services to create new form of industries.
3. Investigate the emergence of new generations of products that tightly link services and manufacturing goods, which includes information technology.

The same report carries on to point out that if the above objectives are to be realized, human resource in Hong Kong will need to be developed. The following areas will need to be addressed with detail analysis, evaluation, planning and implementation of planned actions:

- Overcome the widespread lack of commitment to the development of human resources at all levels of Hong Kong industry.
- Upgrading the competency of English language.
- Develop new capabilities for product and process innovation and design, including engineering and management with the ability to work as a team, creating and designing new products, processes and systems.

- **Develop new breed of personnel capable of operate effectively beyond a single discipline and to combine deep knowledge of science and engineering fundamentals with practical, real-world knowledge and hands-on experience.**

Strengths of Hong Kong Manufacturing / Service Industries.

The uniqueness of Hong Kong geographical and political location has greatly influenced the culture of its industries and workforce. From the early days of British colonial governorship to today autonomic rule under Chinese sovereignty, the Hong Kong economy is continuously influenced by outside political and economical factors. Face with no natural resources of its own, Hong Kong continue to prosper, utilizing its only assets, its geographical location and its people. It is true to argue that Hong Kong has a good economic infrastructure and a huge reserve in the Treasury, which it can buy itself out of any economic crisis. This may be true over the short-term period. One only has to look at Japan economy and you will soon realize that economic problem lies more closely with its people, or rather, the culture and capability of its people. Upon close scrutiny Hong Kong industrial strength lies with its huge reservoir of multi-talented entrepreneurial human resources. The "Made by Hong Kong" report (Berger et al 1997) again identifies and summarizes the strength of Hong Kong industrial workforce as follows:

1. Flexibility in production according to customers' diverse needs - ability to detect changes in trend and to respond with new products, the ability to get goods to customers quickly, the ability on the shop floor to work on many different products at the same time and to switch lines rapidly from one product to another.
2. Coordination - Managers who are capable to master the complex problems of production in territories with relatively lesser industrial experience and complicate political environment. Hong Kong managers are with multifaceted skills: education in engineering and science in HK and abroad, years of work in HK plants with skilled workforce, multiple close contacts with demanding and sophisticated buyers in HK and abroad, experience in international markets, and job rotation through a number of HK companies, across different parts of the industry, collaboration in production with workers who have long experience and skills to rapid learning, operate effectively in the absence of a stable workforce, coordinate the factory and produce consistent result in quality and productivity.
3. Political framework - rule of law, limited government, the protection of individual rights, freedom of information and association that created a public environment that supports economic growth and innovation, is open and secure for foreign investors. Low tax regime, good transportation and telecommunication infrastructure, relative comprehensive education and cheap medical services, public housing program that supplies low cost housing. All these effectively subsidize the cost of industrialization.
4. Internationalism - the ability to understand, interprets and translates into specific and diverse customers' requirements. Large communities of foreign nationals, significant presence of European, Japanese and USA Corporation's regional headquarters and offices, and Hong Kong people bilingualism.

Weakness of human resources development in Hong Kong.

Up until now most Hong Kong manufacturing and service companies tends to resolve problems as it arises, to seize upon manufacturing opportunities and to invest the minimum amount so as to obtain the largest possible margin on the return of their investment.

Troubleshooting, crisis management etc., forms a necessary and important part of the techniques processed by management and technical personnel of the manufacturing industries. Uncoordinated piecemeal approach to resolve problems seems to be the order of the day. This is particularly true for the majority of the medium size of manufacturing companies in Hong Kong.

Upon close examination of this type of approach, at best it can still cope with shorter term of demand of low cost, high quantity type of products and with considerably high wastage of human and materials resources. But for longer term this type of approach is simply inadequate to respond to modern market demands.

If the Hong Kong manufacturing industry in general still adopts this type of approach and explains it to themselves that it is their blend of flexibility and adaptability, then it poses a big question mark on the capability of the industry as a whole to cope with the demands of consumers of today and tomorrow.

2. HUMAN RESOURCE DEVELOPMENT IN HONG KONG

Despite the tremendous growth in prosperity over the last decade in Hong Kong, the number of skilled and semi-skilled positions in Hong Kong has been declining rapidly since the mid-1980s, but the demand of managerial staff, engineers, technicians and other skilled workers has continued to rise (Federation of Hong Kong Industries survey 1995). The fall of skilled and semi-skilled positions can be explained by the fact that most industries have been relocating their manufacturing operations across the border to Chinese mainland, where land, materials and human resources are much more cost efficient. However the trend of rising demand of technical and managerial staff has created shortage of qualified engineering and managerial professionals.

There were comments (Federation of Hong Kong Industries survey 1995) made to suggest that Hong Kong higher educational institutions do not tailor their teaching and research activities closely enough to industries' needs and that local graduates are weakest in the area of management and human relation skills, lack of practical knowledge. All employers expressed strong preference of North American and European University graduates to local graduates. The difference being the broader and more practical experience and knowledge and the extra edge in creativity and initiative. Thus the narrowness of education received by current higher education graduates, lack of general management skills need to be replaced by new capabilities not just for management and finance, but also includes a thorough understanding of basic technological concepts of product / process innovation and design, with the ability to work as a team, creating and designing new products, services, and its relevant processes and systems. What is required is as the "Made by Hong Kong" suggests, a new breed of personnel capable have operate effectively beyond a single discipline and to combine deep knowledge of science and engineering fundamentals with practical, real-world knowledge and hands-on experience.

3. VOCATIONAL TRAINING SYSTEM IN HONG KONG has undergone a major review in 1997, apart from reorganization of the Vocational Training Council management and organizational structure; it also recommends focus on strengthening the role of employers in the design of training strategies for different sectors of the economy. Flexible and vibrant vocational training system is desperately needed for Hong Kong to realize its aspirations for knowledge intensive, high value added economic growth.

This has led to increasing attention being paid to initial and continuing vocational education and training. The Vocational Training Council in Hong Kong has embarked on ambitious programs of reform to ensure a supply of skilled labour for industry and commerce. Their objectives are clear, that is to provide technical education and training to meet the changing demands of the economy with high degree of flexibility and responsiveness. Their overall strategy is to review their resource deployment, quality of work and efficiency of all the operating units, to enhance their information infrastructure and to identify a new methodology so that improved labour market analysis can be carried out, allowing the re-deployment of their resources according to social demand. (Lee 1997)

But it is clear that current processes of planning and implementation of initial and vocational education do not prepare workers for the new work activities. Analysis of current Vocational Education and Training plans disclosed shortcomings that are inherently built into the planning method itself, deficiencies include problems associate with centralization and objectifying of curriculum development and design, slowness in response to society needs and adaptation-oriented tendencies. It denies the opportunity of active participation for those directly concerned, i.e. in-company human resource planners and the young people themselves. If future can be foreseen and predicted more accurately, the more awareness of the possible shortcoming of the VET plans can be brought about and the better preparation and provisions can be made for these shortcomings.

Technical innovation of today and tomorrow creates a very complex world and to learn to cope with such complexity is now becoming overwhelming. One method to education and training of future vocational personnel may be **through innovative learning, by participation in the present and to anticipate of the future.**

To be more specific, one can argue that VTC objectives could include -

- The development of closer links between the operating units of the VTC and the local industrial and commercial enterprises,
- The development of core skills and/or key qualifications,
- Measures to ensure the parity of esteem of vocational education and
- Moves to promote continuous training and lifelong learning.

But we mustn't lose sight of the challenge we are facing with is that new forms of work organization and relevant human resources are required for the ever shortening product life cycle, new standards for quality assurance and an explosion in the implementation of new technologies. If the traditional forms of vocational education and training are not overhauled radically, both in concept and in its operating mode, one can doubt that whether it can achieve its objectives.

Comparison of the three basic methods of vocation education -

- Training on the job, trainees are assured of job and income security, but the program (e.g. apprenticeship) can be long and in a narrowly defined skill or trade. Ratio of trainee to training course is relatively small and cost can be relatively high.
- Training off the job in education establishments, has the advantages of accommodating a large number of students and offering a variety of courses, but require a minimum number of students and instructors for the course to be effectively and efficiently run. These programs tend to be inflexible and can involve expensive equipment. Also no guaranteed of employment after the course is completed.

- Combined type of Training on and off the job, co-operative work/study programs provide income and experience while allowing trainee to achieve an academic qualification, require close coordination of roles of employer and training institution.

For most developing countries, Vocational education (training off the job) is normally the favorite choice, since it has the least administrative and operational obstacles. For advanced industrial and commerce countries the combined type of training is normally the chosen form of Vocation education, e.g. Dual system in Germany and the Sandwich courses offered in UK and some European countries. In Hong Kong all three types of vocational education are practiced.

Efficiency and effectiveness of Vocation Education and Training, ***how is it measured and monitored*****?**

- Most effective type of training. Measure benefits of a program derive from the quality of instruction or from the employment opportunities available.
- Cost efficient. Cost of a given training method is taken into account to measure against some form of economic and social returns of Vocation Education.

Review of Vocational Training Council Employment and Attrition statistics will soon identify some inadequacies of the current system. There are high drop out rate and low employment rate for Technical Institute students. The same statistics indicates that Technical College students did better but drop out rate still remains unsatisfactory. The main cause cited for the high drop out rate is that students lost interest in the courses they attended, very often in the first year of study.

The issue is not which method is more cost effective but rather under what circumstances one type should be chosen over another. **The solution must be reached by a systematic exploration of conditions.** Both economic and social factors will determine the choice. The decision to train workers on the job, off the job or with some combination of the two methods will therefore depend on the analysis of all these factors.

Economic factors - average cost per graduate, affected by the scale of operation, the optimum number of programs offered in the same institution, the nature of laboratories and workshops, the costs of teaching staff will be affected by its scarcity and quality.

The average cost of a program will depend not only on enrollment per program but also on the mix of programs offered by the institutions.

Social factors - characteristics of the labour market such as level of employment, level of wages and the entry requirement of jobs (some occupations have standard prerequisites for entry. Industry/commerce are bias against a certain type of education. The social image of a certain type of education (that is eventually determined by well-planned curriculum, competent administrators and teachers with both practical experience and pedagogical ability).

4. VOCATIONAL EDUCATION AND TRAINING OF THE 21ST CENTURY WORKER.

The traditional approach for vocational education and training is to provide skills and knowledge for the learner to adapt to current social and technological development. In other words, it always follows behind new technology and new economic development, learning to cope with what is new and what is needed. Very often students found that their knowledge gained in vocational training institutions are inappropriate, out of date and unsuitable for their needs. This is entirely inadequate for the new forms of work organization and relevant human resources, which is required for the provision of 21st century products and services. Instead workers should be given the knowledge and skills to utilize available technologies, to control their work organization and to shape and design new methods / processes for new generation of products and services (F. Rauner, 1995).

Expertise cannot be developed through simple although extended information acquisitions, but only through continuous and subtle cognitive experiences related to putting knowledge into action, co-developing personal and professional knowledge into the larger dimensions of knowledge held by groups and whole organizations." (Attwell et al 1997).

The above statement on **work related knowledge** aptly describes the significance of types of skills and knowledge that Vocational Education and Training (VET) professionals have to recognize both as planners and as teachers. Further it might be useful to distinguish different types of knowledge. Lundvall and Johnson (1994) identify four different kinds of knowledge - know-what, know-why, know-how, and know-who.

- Know-what refers to knowledge about facts and information of the specific topic.
- Know-why refers to scientific knowledge, influencing technological development and the pace and characteristics of its applications in relevant industries. This is not dissimilar to production and reproduction processes in organized institutions, such as universities, scientific research organizations and technical colleges.
- Know-how refers to skills refers to skills and capabilities to do something ion different contexts, e.g. judging the market prospects for a new product, or operating a machine tool etc.
- Know-who refers to a mix of different kinds of skills, allowing the access and use of knowledge possessed by someone else.

Another important aspect concerning knowledge is that certain dimensions of knowledge cannot be taught or explained. "We can know more than we can tell" (Michael Polanyi 1962) explains that that there is a level of knowledge that cannot always be put into words or linearly explained. This level of knowledge can only be obtained by focusing on certain elements of the subject matter and by successive feedback of what was learned previously. To put it simply, by doing, practicing and learning from past experiences of successes and mistakes. This is very similar to the standard definition of skill - ability to do something well especially as a result of long practical experience and / or a particular technique.

The term **"work process knowledge"** (Attwell 1997) can be used to summarize the above statements of knowledge and skill - it can be regarded as knowledge encompassing the whole work process, often acquired through the experience of work, which is required for successful performance in the workplace. Thus work related knowledge and work process knowledge enables the workers and the workplace management to have clear focus on learning, knowledge acquisition and development.

However work experience or on the job learning alone does not lead to work process knowledge, it requires the guidance of teachers and trainers through a planned learning program. Without this structured program may lead to the learners' development of narrow mindedness and limited capability of reproducing what is observed. In the fore coming century, rapid changes in technology will continue, new forms of work organization will continue to develop and evolve. **Thus work process knowledge for the 21st century worker have to include not only a broader and deeper knowledge base, but also the capability of application and adaptation of these knowledge to cope with new situations and to meet future change.**

The implication of new form of work process knowledge will have profound effects on 21st century vocational education and training. Especially in Hong Kong, where economical, social and technological changes are influenced mainly and frequently by external factors. VET professionals will need to have a thorough understanding of their own subject based knowledge and competence to related occupational fields. They will need to have the ability to plan curricula and design learning programs to **incorporate**

knowledge of present and future context in which skills and competencies are to be applied Furthermore the concept of work process knowledge has to be linked to the idea of life long learning. Initial vocational education and training only forms the basis for the development of work process knowledge. It is this initial knowledge base that will help the new age workers to change and shape the 21st century work organization through the application of advance technology.

5. THE CONCEPT OF "SHAPING THE 21ST CENTURY WORKER" FOR THE HONG KONG MANUFACTURING AND SERVICE INDUSTRIES.

The philosophy of this concept is instead of people adapting to socio-economic and technological developments, they should be given the necessary competence to work self-reliantly and independently. They should be able to utilize creative and communication skills to shape work conditions, work organizations and work contents in order to create and facilitate innovations. This shaping concept can be achieved by imparting the relevant **work related knowledge** and **work process knowledge** to the intended individuals. But here lies the main problems of **what and how** to deliver this knowledge.

With technological advances, analytical and communication skills were required as well as more theoretical knowledge. In developed economies rapid technological change required workers with more flexibility and a deeper theoretical knowledge of their occupation. The abolition of some occupations and the creation of new employment opportunities necessitated training or retraining of workers. Industrial sector's growing demand of skilled workers, vocational education provides not only specific vocational training but also general education - reading, writing, mathematics and science. Thus the vocational education process is an integration of **all the transformational knowledge and methods ranging from identification of customers' need to fulfillment of customers' satisfaction,** both in terms of service and products.

The heart of the matter is **'What"** does industrial human resources need and "How" can these needs be satisfied? One method is that we can anticipate needs by referring to past historical statistics and to forecast future trends of requirement. Recent publication "Manufacturing 2000" by the Hong Kong Education and Manpower Planning Department will show that its validity and usefulness in forecasting the future is limited. Even the latest updated republication of this report fails to catch up with 1998/9 requirement, let alone year 2000 and beyond.

There are other innovative concepts, which are more futuristic oriented. The **Scenario method (G.Heidegger 1998)** suggests four scenarios of interconnected work, technology and education to describe possible situations of the future industrialized society. In order to plan more effectively for the provision of vocational education, systematic efforts has to be made and to take into account of prospects of future development of work and technology. If the future of work becomes visible, at least in the horizon, then it can become a decisive aspect in the anticipatory and shaping-oriented vocational education planning process. Briefly the four scenarios of future work can be summarized as follows -

1. Computer-aided Neo-Taylorism - work and technology become more prominent; work will be subdivided and automated increasingly. Human resources of two main types will be required - a. peripheral workforce with low qualifications and fluctuating composition to man the residual tasks (which can also be automated except that employment of labour is still more economical). b. Core staff of well qualified skilled workers for the complex design, development and production work.
2. Computer-aided Humane Rationalization - extensive and accelerated automation of all possible and suitable tasks, even if this increases economic costs, resulting radical reduction in working hours. The higher-level technical staff will carry out the work tasks in the professions that cannot be shortened as desired.

3. Dichotomized Re-professionalization - corresponds to present experience that is characterized by a relatively slow rate of development and introduction of technologies. The current industrial hierarchical structures will remain unchanged and that human intervention in production and administration will be significant. A new breed of semi academic skilled type of workers who can carry out a wide range of practice related and theory oriented type of work, adapting to technological, economical and political changes when it arises. The more capable elite of professional staff will still man the management tasks at a higher level.
4. Integrated vocational and general education - a non-futuristic technology scenario is assumed whereby simple peripheral jobs are retained. Various people acquire very different combinations of skills during their occupational life. Occupational work becomes more significant and that an integrated vocational and general education is required for the training of specified abilities.

Yet the economic, social and political structure and climate in Hong Kong is so complex and sensitive that any of the described scenarios or a combination of these scenarios can occurred, making the prediction of an overall picture almost an impossible task. However these scenarios can and will help if we try to segment the Hong Kong industries into different occupational profiles.

One can try to visualize that in Hong Kong, most business services e.g. banking, commerce, can be adapted to *Computer-aided Neo-Taylorism* scenario; information technology, telecommunication and the electronic manufacturing industry can be aligned to the *Computer-aided Humane Rationalization* scenario. While the majority of manufacturing activities in and surround Hong Kong can be classified as the *Dichotomized Re-professionalization* category and the more mundane and manual type of manufacturing operations which have been or being transferred and relocated to mainland China can be classified as the *Integrated vocational and general education* type.

But any visualization of these scenarios needs to be substantiated by factors, relevant trends and dimensions that can indicate its likely consequences. The Delphi method (Van Wieringen 1998) suggests structured consultation of experts by means of questionnaires and interviews might be required for the -

- Identification of patterns and trends in economic technological and industrial events.
- Classification of predetermined and uncertain variables and their order of importance and predictability.

This method might provide relevant information and data, yet it still does not produce clear-cut guidelines for the formulation of scenarios into different professional profiles. Recent study aimed at outlining future occupational profiles of teachers in primary education (Meelissen and Brandsma 1995) adopted the following approach. Two rounds of consultation in forms of questionnaire were conducted. During the first round, questions concerning factors, relevant trends and dimensions of related occupational profiles in general terms were surveyed. These questions are supplemented by subsequent discussions on the likely consequences and the probability of occurrences.

In the second round, respondents were asked to reconsider on those statements that bear low level of consensus.

Observing the pros and cons of the above approaches, the following methodology is suggested for the development of various scenarios, which in turns will provides detail information and guidelines for the formulation of related "**professional profiles**":

Phase 1 Investigation of local trends of industrial developments and future requirement human resource requirement by means of questionnaires and interviews of industrialists, technologists, educational professionals, economists and politicians.

Phase 2 Using data and information obtained from Phase 1 and applying "Shaping Methodology" to generate scenarios of possible future human resource requirement, survey of industrial organizations feedback according to these scenarios.

Phase 3 Summarize information to form basis for development of various professional profiles.

It is anticipated that the question of **"What does the Hong Kong industry need in human resources for the 21st century"** will be answered in the formulations of the **various professional profiles**.

The following are some of the suggested actions -

1. To conduct survey on past and present study and reports on the state of service and manufacturing industries of Hong Kong and China.
2. To conduct survey on past and present study and reports of technical education for manufacturing industries of Hong Kong and China.
3. To liaise with other leading vocational education institutions (e.g. Institute of Education and Technology, Bremen University, Germany) to gain experience and techniques on research methods, curriculum design and implementation of planned actions.
4. To visit manufacturing companies of various industries (e.g. plastics, metal working, electronics, light engineering, watch making, electrical equipment etc.) in Hong Kong and China, to conduct survey and research of their development plans for the next ten years, their investment plans, their requirement for technical support services.
5. To visit various companies of commercial and business service industries (e.g. banking, insurance, finance etc.)
6. To visit various technical education institutes in Hong Kong and China, to conduct survey and research into their existing and future plans of provision of technical education for the manufacturing industries.
7. To review surveys conducted by various government agencies on economic, political and social environment that will affect the development of the manufacturing industries.
8. To review surveys on trends of student preference of study, their ability of learning of technical subjects, their future outlook on their employment and the supports given by various government and private institutions on technical education.
9. Collate and summarize gathered information and data, utilizing a special designed computerized simulation model to analyze these data and information to generate summarization of individual scenarios for the provision of technical education in Hong Kong and Southern China.

6. THE PROVISION OF WORK RELATED KNOWLEDGE AND WORK PROCESS KNOWLEDGE FOR THE VARIOUS PROFESSIONAL PROFILES.

Here lies the main problem of how and in what form. If the goal of vocational education and training is to provide individuals with competence

- To work self-reliantly and independently,
- To utilize creative and communication skills to shape work conditions, work organizations and work contents,
- To create and facilitate innovations,

Then one must examine the effectiveness and efficiency of existing traditional form of vocational education and training. Review of current vocational education and training system shows it often lacks objectivity and the approach is bottom to top. That is -

- Too much method oriented in the curriculum and requires too much learning.
- In most areas, students lack motivation, case experience and confidence.

- They cannot be ready to deal with open-ended practical problems.

In observing the highly developed industrial countries, their established vocational training systems were largely established base on the following criteria:

- Consider how to meet social needs.
- The world is much more technologically and economically competitive.
- Demand on quality and capability of graduating students is high and diversified.

Acquiring ability to co-shape work and technology has become a guiding principle for vocational education and training (F.Rauner 1995). The overall objective is to provide the trainees with work process related abilities and their ability in continuous acquisition of updated work process and related knowledge. It was suggested that work process knowledge should be provided in the form of key qualifications, encompassing work and technology at all relevant levels. Thus VET not only prepares one for occupational work, but also develops one's formal abilities to co-shape work and technology by a design of interchangeability of curricula, through the guises of key qualifications.

This concept was further explored and applied extensively in the "Car Mechatronic Concept" project (F.Rauner, G. Spottl, 1995), a European occupational profile for the initial training of a Car Mechatronic. Subsequently a curricula framework was developed, providing vocational education and training in response to the structural changes in the car service sector from traditional garages to modern services businesses, featuring customer oriented quality work. The car mechatronic is able to deal with all aspects of modern high-tech cars and service demands of customers. The Car Mechatronic is also provided with the ability to participate in shaping work and technology.

The initial training of Car Mechatronic oriented towards work process knowledge, especially prone to workplace based. Deeper, specialized knowledge will be provided through further systematic training. Thus the curriculum for a Car Mechatronic aims at a practice-oriented vocational training, facilitate by specialized training programs through training institutions and participating companies.

This concept also promotes innovation in work organization of the workshops, introduction of team concepts, increase flexibility of the employees and improvement of co-operation with car manufacturers.

On close examination the curricula structure of the Car Mechatronic concept is neither based on traditional school based vocational education where all relevant available technical information are taught, nor it is based on company based vocational training where it is normally structured around fragmented tasks to provide restricted area of objectively measured skills. Rather it is developed along a content driven and work process approach. In other words the contents of the curriculum are gained through work processes but not technology.

If the aim is to cover the knowledge and skill required by a competent worker for the required work tasks, then work itself has to be treated as an entity, the related work tasks in the workplace can then be listed and structured into learning fields and classified into levels.

The learning areas covers:

1. Objects of skilled work - functional work related knowledge.
2. Tools, methods and organization of skilled work - functional work process knowledge.
3. Requirements for skilled work and technology - integration of functional work related and work process knowledge.
4. Training objectives - application of skills and knowledge, enhanced with social and communication skills to achieve the objectives of work.

According to degrees of complexity and difficulty, the skills and knowledge provided to the prospective trainees can be classified into three or four levels, ranging from basic to specialized training.

A work process oriented curricula can be designed, consists of two inter-related structural areas, the learning contents and knowledge of work process. According to the proximity of relevant validity, the curricula can be delivered in either the VET institutions or the workplace itself. Close collaboration between VET professionals and workplace supervisors/management will form the backbone of the teaching/supervision function, with special emphasis place on continuous feedback, improvement and development of work related and work process knowledge.

Thus VET professionals of the new age not only have to be conversant with their own subject areas, but have to continuously updated themselves in the relevant field of work and to possess the capability of designing, developing and delivery of the new form of vocational education and training.

7. HOW TO DELIVER THE NEW FORM OF VET?

The above describes briefly the macro structure of new form of VET, but question of "how" in terms of micro details have yet to be answered. If one looks at training and education, the term "Course" inadvertently appears. Generally speaking course can be described as a sequence of structured learning with a time interval between each session and the next. The course may stands on its own or it may be part of a program of studies aiming towards a formal qualification. But what types of courses are appropriate for the new form of VET? Could it be the combination **of "knowledge-oriented courses ", "Methodological courses" and "Issue-based courses"** (D. Rowntree 1981)? The question remains at how do we combine subject matter knowledge and the methodology of various academic discipline to prepare the student for the work tasks intended.

Knowledge-oriented course aims to get the student to learn and apply the subject matter for its own sake, but not as a vehicle for learning something else. Most pure science courses come into this category, e.g. physics, engineering sciences, biology, chemistry, etc.. Abundant subject matter has to be learnt by the student. Often, memorizing data and facts becomes more important for the student, that is if they want to pass the examination and gain the qualification intended. This leaves little time for them to think about it and to apply it to real life situations.

Methodological courses aims to provide intellectual, physical or social procedures or skills so that students can be a performer in the subject, rather than a spectator or a commentator on the knowledge achieved by others. Methodological courses can be of two types: Task-oriented and Discipline oriented.

Task oriented courses train the student to carry out some clearly defined activity, normally at technician level. Series of specific tasks and procedures are designed to train the students to deal with predictable work situations. Here only "how to do it" knowledge is transmitted.

Discipline oriented courses provides the opportunities for the students in learning a methodology that can be adaptable to a wide variety of circumstances. This methodology encroaches skills and knowledge that will enable the students to apply what they know, to acquire what they don't know, to think and deploy new and improved ways to tackle the work tasks at hand and within their subject area.

Issue-based courses centers on some issue or problem, which are seen to be relevant and significant to the student. The teaching will provide the students with conceptual tools and methodological tools for resolving the issue or arriving at a reasonable solution of the problem. These courses can often be multi-disciplinary whereby the contributing disciplines are introduced separately and attempt to inter-relate them towards the problem solution.

Before we can further our investigation into what courses and curriculum for VET, we must also include the students' needs into our considerations. It is crucial that if we were to motivate students we must identify and fulfill their needs. Their ability and capability to be educated and trained has to be taken into account as well.

If we can identify that the students needs hierarchically, it is argued that they will need to

- Get a job to provide for their physiological needs,
- Get a secured job so that they can feel safe,
- Get a responsible job so that they can be of social significance,
- Get a job with good promotional prospects to extend and to actualize their intelligence capacity and capability.

Thus if any VET program is to be effective, it must also caters for the students' ability, capability and needs.

Project based learning (J. Henry, 1994) represents a different approach form traditional schooling. Instead of the teacher deciding what topics and materials are relevant to the student. By definition, project is a set task given to students, to be completed at a given period of time, subjects are taught with some reference to some chosen topic, and students are encouraged to make independent enquiries to supplement formal teaching. In Project based learning, the students are allowed more control of the topic, seeking and equipping themselves with knowledge and skills that contributes to the solution of the task/problem at hand. The teacher takes on a different role, becoming more of a facilitator and adviser than pedagogue and expert.

If the overall objective of VET programs are to provide the trainees with work process related abilities and their ability in continuous acquisition of updated work process and related knowledge, then a **combined approach is suggested. Project based learning, incorporating various learning areas, structured in relevant levels, where work related and work process knowledge is transmitted and practiced through a combination of methodological and issue based courses, in VET institutions or in workplace where appropriate.**

Thus tasks in the workplace can be grouped and classified into projects of different levels.

Learning contents of projects can be provided in learning institutes, in the form of methodological and issue based courses. This will enable work related knowledge to be gained by the students.

Thereafter work related knowledge is used for practice in simulated situations, preferable in the VET institutions, allowing the students to gain some insight into the work process knowledge that lies ahead in the workplace.

The students will practice work related knowledge in assigned workplace to gain skill and work process knowledge in project form, gradually working their way up through different levels, gaining the competency, skills and knowledge intended for their field of work.

Under the tutorship of experienced supervisors and VET professionals, social and communication skills are obtained and utilized by the students, enabling continuous feed back and to seek further improvements.

After the completion of groups of projects in designated areas and progressively at different levels, the students will then be able to handle work independently, coping with unforeseen problems and to continuously update and improve themselves.

8. TRAIN THE TRAINERS.

If teachers and trainers are to utilize the workplace as the basis for lifelong learning, then they, themselves will need a thorough grounding in occupational/technical skills and work process knowledge. So far the focus was on the design of workplace as a medium and opportunity of acquiring work process knowledge, attention has to be paid to the role of teacher and trainer in mediating and facilitating this process. VET professionals should have an understanding of the theories of learning and be able to design learning situations based on the needs of the trainees, as well as the possession of skills and knowledge that will allow them to move from different contexts for learning.

Most Hong Kong VET professionals are predominantly professional teachers or practicing professionals. Very few have undergone specialist VET education as such. On close examination, VET professionals should possess both technical and pedagogical skill, especially if the suggested "Shaping" concepts of various professional profiles are to be practiced. In Europe, similar problems are encountered.

The report on new curriculum profile for the education of VET professionals"(G. Attwell, 1997) highlights the shortcomings of university programs in Europe, that it is normally based on academic areas and usually short and low level training courses. Most of these courses are for the development of training and competencies for skilled workers. The report carries on to point out that a strategic approach is required for the education of VET professionals. This analysis has led the European Commission to initiate a project new Forms of Education of Professionals for Vocational Education and Training"(EUROPROF). Subsequently a curriculum framework outlining the structure and content of a new Masters (MA) Degree qualification is produced. The program consists of four sections:

1. General background for vocational education and training including the history, structures and systems of VET and the economy and the labour market.
2. Vocational pedagogic covering the theory, practice and research in VET, methods and tools of research in social sciences, VET didatical theories, methods and approaches.
3. Examination of the development of occupations and occupational fields; the development of curricula and its related teaching and learning processes; opportunities for the development of learning situations for the analysis, shaping and evaluation of occupational work; development of life long learning and professional expertise through participation in the shaping of work.
4. Specialized area underpinning occupational profiles and skilled work in related area includes both theory and practice in the general subject and specialized areas within that subject.

There is little doubt that VET will be critical for the economic and social development in Hong Kong, especially into the 21st century. Future economic and employment development does rely heavily on the skills and knowledge of its workforce. There is urgent necessity for Hong Kong VET professionals as an entity to review their capabilities in meeting the future VET needs, to update and educate themselves, to help to shape the new VET principles that is in much need for the implementation of the new form of VET.

9. CONCLUSION.

The customary processes of initial and continuing vocational education and training do not prepare and equipped workers with ability and capability for the work activities of the 21st century. New concepts of occupational-related didactics, with their methodological implications, along with emphasis on life long learning will need to be developed. Attention of VET has to focus upon the provision of multi-skilling, flexibility and adaptability, ability to shape the design and organization of work for the 21st century worker.

VET professionals serve key functions in initiating and implementing a (initial and continuous) shaping oriented vocational education and training. In order to qualify and equip VET professionals in these capacities, the form and quality of their own initial and continuing education is of decisive importance.

The way ahead.

If the overall objective of VET is to equip Hong Kong with a well trained workforce to meet the demands of a dynamic economy and to contribute to the overall economic competitiveness (Education and Manpower Bureau, 1997), then a proactive rather than a reactive approach has to be adopted. One of the current Vocational Training Council commitments is to identify a new methodology so that improved labour market analysis can be carried out.

If this methodology is to be proactive, a more pragmatic rather than hypothetical approach has to be adopted. Industries has to be consulted and surveyed to form possible **scenarios** of what human resources might be required for the future. It is proposed that VET professionals will then apply the "**Shaping**" concept, enhancing these initial findings, according to various occupational requirement, forming "**professional profiles**" to suit relevant industrial needs. To ensure the validity of these so call "professional profiles", it is suggested that both industries and prospective students are to be briefed and consulted, inviting feedback for further updating and improvement of these "professional profiles".

A pilot scheme can be conducted into one or two of the main industries, e.g. manufacturing industries, banking service industries. The outcome can be used for development of an overall labour market analysis methodology. Further these outcome could be used as basis for development of "Shaping" concept of VET - that is, an integrated package with different levels of project based tasks groups through the provision of necessary work related and work process knowledge in relevant Professional profiles, jointly administered and delivered by VET professionals and workplace management. Similar schemes can be developed, taking into account of experiences and further improvement, for other industries.

Such pilot scheme can be planned, potential support can be sought from:

- Hong Kong Vocational Training Council, in the form of human, financial and facility resources, and in providing the background surroundings for conducting such research.
- Institute of Technology and Education, Bremen University of Germany (a world leading institution in vocational education) where experts' research experiences and facilities in related fields can provide guidance in planning, research and implementation of the pilot schemes.
- Education Development Unit, Hong Kong Polytechnic University, where pedagogical and didatical experiences and knowledge for local environment can be provided in forms of short courses and mini research projects.
- Institute of Vocational Education, Shanghai Tongji University PRC, where vocational education and training experience and research data can be shared through collaboration projects.

Equally important and urgently needed is that VET professionals have to be re-equipped with skills and knowledge to design, develop and deliver the new form of VET for the 21st century worker, base on the "Shaping" concept. To this end help has to be seek from other institutions that has prior experience in relative field.

In summary, development of "Professional Profiles" and VET professionals, in my view are two of the most important aspects that are in need of urgent attention. It is hoped that my limited contribution in the form of this report can provide some stimulus and impetus to the acceleration of provision of Vocational Education and Training for the Hong Kong 21st century worker.

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BIOGRAPHY

Mr. Manwey Leung is a Senior Lecturer of the Manufacturing Engineering Department in the Institute of Vocational Education (Chaiwan campus). He is a Chartered Engineer and a Senior Member of the Chinese Mechanical Engineer Society. He has worked in manufacturing industries covering various European countries for over twenty-five years, ranging from production engineering, to product development and to project management. His previous employers include Black and Decker PLC and Lucas Industries. In 1995 Mr. Leung was nominated by the Osaka Business Council to participate in the Factory Improvement Program in Osaka, organized by the Association for Overseas Technical Scholarship (Japan). A strong advocate of the 5S discipline in manufacturing, Mr. Leung believes that the human centered approach supported by appropriate discipline is a vital ingredient for success in manufacturing industries. The phrase CANDO (cleanliness, arrangement, neatness, discipline, organization) coined by Mr. Leung is widely used in Japan and United Kingdom, in conjunction with the 5S activities. Currently Mr. Leung is teaching manufacturing engineering subjects and conducts research into Knowledge-based teaching / learning methodology for vocational education and training.

QUALITATIVE MEASURES OF THE RESPONSIVENESS OF POSTSECONDARY TECHNICAL PROGRAMS TO THE NEEDS OF INDUSTRY

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Index: Community Colleges; Institutional Responsiveness; Postsecondary Technical Education

Abstract: Institutional responsiveness is a measure of how responsive an institution is to its market. The market includes all stakeholders (students, businesses, and the community). Several major issues were examined in this study, including responsiveness to the labor market, job placement, graduation rate, and quality of program. Implications from this study should be quite useful to IVETA and members of our global community. The study was funded by a grant from the Pennsylvania Bureau of Vocational Technical Education under the auspices of the Carl D. Perkins Vocational Education Act (Public Law 105-332-Oct. 31, 1998).

INTRODUCTION

A fundamental question that continues to be a major issue in the delivery of postsecondary technical and occupational education programs is: how responsive are community colleges and two-year proprietary institutions to the labor market in establishing appropriate programs? We are aware that American business and industry need a highly skilled workforce in order to compete in a global economy, community colleges and other two-year post-secondary institutions are in the best position to fulfill that need (Grubb, 1996; Farmer & Key, 1997; McCabe, 1997; and Bragg, 1998). We also are aware that 65% of jobs in the new millennium will require more than a high school education but less than a 4-year college degree (Gray & Herr, 1995). Nevertheless, the question concerning institutional responsiveness to the labor market continues to be debatable among stakeholders.

In the state of Pennsylvania there is a critical need for postsecondary technical education data in areas such as program outcome and follow-up measures to include employment trends and types of training provided to graduates of two-year institutions, both public and private. In the Commonwealth, there is also a need to provide legislators and educational leaders with appropriate information to make appropriate decisions on the management of post-secondary technical education. Therefore, the purpose of this study was to conduct a series of case studies in order to provide an in-depth understanding of postsecondary technical and occupational education programs in community colleges and two-year proprietary institutions in Pennsylvania. The study was divided into three phases: Planning and Organization, Implementation, and Follow-up. This paper describes the results of the third phase that involved follow-up measures of postsecondary technical and occupational education programs in Pennsylvania.

CONCEPTUAL FRAMEWORK

The design of all research requires conceptual organization, ideas to express needed understanding, conceptual bridges from what is already known, cognitive structures to guide data gathering, and outlines for presenting interpretations to others (Stake, 1995). The framework for this study is based on the state of-the-art principles in Stake's work, *The Art of Case Study Research*. Actually, the case study is a compromise between Ethnography and Grounded Theory; both are qualitative methods that are suited for different purposes. Ethnography gives us the richest understanding of the culture and ethos of a particular program, event, etc., but it is very time consuming and has very limited generalizability. On the other hand, Grounded Theory promises greatest generalizability among qualitative research methods but is often quite costly and time consuming. The case study does not give as rich an understanding as Ethnography, and it is less costly and time consuming than Grounded Theory.

METHODOLOGY

A qualitative research perspective was employed using the case study approach. This approach was considered the best methodology for addressing the magnitude of issues that exist in Pennsylvania's two-year postsecondary institutions that offer technical and occupational education programs. Moreover, the case study approach was selected because this study focused more on insight, discovery, and interpretation rather than hypothesis testing. Other researchers concur with the author in using this approach. For example, Grotelueschen (1980) offers an essential reason for choosing a case study design when doing evaluation or follow-up measures: "case study is appropriate when the objective of an evaluation is to develop a better understanding of the dynamics of a program. When it is important to be responsive, to convey a holistic and dynamically rich account of an education program, case study is a tailor made approach." Gall, Borg, and Gall (1996) stated that a case study is done to shed light on a phenomenon, which is the processes, events, persons, or things of interest to the researcher. Some examples of phenomena are programs, curricula, roles, and events. Once the phenomenon of interest is clarified, the researcher can select a case for intensive study (Gall, Borg, and Gall, 1996). However, a case is a particular instance of the phenomenon. Finally, Merriam (1988) reinforced the assertion that the case study is particularly suitable for dealing with critical issues of practice and extending the knowledge base of various aspects of education.

DATA SOURCES

A project research team was organized to conduct five case studies of selected urban and rural community colleges and two-year proprietary institutions in Pennsylvania. The project research team consisted of a project director, qualitative researcher/consultant, and three graduate research assistants. Using the following procedure, the project research team: (a) received formal instruction on case study research from the qualitative researcher, (b) selected appropriate case study locations, (c) conducted on-site observations, (d) debriefed with the qualitative researcher, (e) refined field notes, (f) transcribed tape recordings of interviews, and (g) analyzed data using triangulation and Atlas software. The selection of the institutions was based on four essential characteristics: location, financial aid available, academic reputation/quality, and support services available. The five case studies were designed to investigate two qualitative research questions: (a) how responsive is the institution in establishing appropriate technical and occupational education programs, based on the needs of the labor market? and (b) how responsive is the institution in providing effective instruction?

In reference to site and sample selection, five institutions were chosen for their unique qualities. The specific qualities of each institution are described as follow: (a) Northampton Community College is located in a rural area and it is a residence campus; (b) Delaware Community College is also located near the suburban area of Philadelphia and is unique because of its exceptional facilities for individuals with disabilities; (c) Bradley Academy for the Visual Arts was chosen because it is a proprietary institution with a distinguished reputation in visual arts; (d) Pittsburgh School of Aeronautics was chosen because it was also a well known proprietary institution in another geographical location; and (e) Community College of Allegheny County was chosen because it is the largest and most influential among the community colleges in Pennsylvania.

TRIANGULATION OF DATA

A major strength of case study data collection is the opportunity to use many different sources of evidence (Yin, 1994). The triangulation data collection procedure was used to review, analyze, and verify the institutions ability to be responsive to their labor market. According to Yin (1994), triangulation is a strategy that allows different qualitative research methods to be combined. Moreover, Miles and Huberman (1994) suggested that by looking at a range of similar and contrasting cases, a single-case finding could be understood. Other researchers have also concurred that the combination of three or more research methods through triangulation provides a greater assurance of validity within a study (Bogdan & Bilken, 1992; Maxwell, 1992; Yin, 1994).

FINDINGS

The results of the case studies revealed many useful findings regarding the responsiveness of community colleges and two-year proprietary institutions to the needs of the labor market, graduation rate, job placement, and quality of programs. Lauch Faircloth's, United States Senator (Republican-North Carolina), public statement expressed the essence of the findings. He stated, "community colleges are the only job training program I have ever seen the federal government put its money into that works." Moreover, President Bill Clinton articulated the importance of community colleges for all Americans in his speech at Gulf Coast Community College in Panama City, Florida. The President stated: "I believe America ought to work the way the community colleges in America work. I believe they are the ultimate democratic institution, small "d"; open to everybody, where everybody has a chance; results-oriented; flexible, not bureaucratic; and working in partnership with the private sector; and guaranteeing opportunity for everybody who is responsible enough to seek it" (Clinton, 1996).

The findings from the five studies revealed four major themes: policy issues, student profiles, labor market issues, and curriculum content. In the area of policy issues, it was revealed that Pennsylvania experienced a brain drain, the migration of 13,500 labor force age adults (20 to 29 age group), between 1995 and 1997. Policy is needed to provide incentives to prevent this migration of human capital. Student profile data showed that male students outnumbered female students in postsecondary technical programs. This particular finding is inconsistent with national data that shows there are more female students (52%) than male students (48%) in community colleges. Public opinion supports the belief that students attending community colleges do so with the intention of transferring to a four-year institution. However, the findings revealed a different picture; most of the postsecondary technical students indicated that their career goal was to enter the labor force upon graduating from their respective programs. In the area of labor market issues, most of the students were interested in completing some of the "hot" technical programs, i.e., computer-related technologies. The "hot" programs represent the technical skill areas that are critical for high technology and nationally competitive industry and businesses. The final theme related to curriculum content, most of the postsecondary institutions had begun incorporating tech prep and school-to-work initiatives to improve their curriculum. The results of the curriculum inclusion have been positive because community colleges are starting to receive recognition for their product—the student. The graduates of community colleges are making a favorable impact in the workplace, as indicated by noteworthy business leaders.

One of the most successful business leaders in America, Bill Gates, CEO of Microsoft, recently expressed his approval of community colleges in preparing persons for the workforce. Gates stated that "America is leading the way in high technology and in the next seven years it's estimated that 80 percent of new jobs in this country will be in high tech. Community colleges have an important role to play in making certain we have skilled workers ready to help businesses take advantage of all the opportunities in the Digital Age." Jim Adams, chairman of Texas Instruments, indicated "the community college system is an absolutely imperative part of the fabric of education in this country. It's the thing that will help us be competitive leaders in the world, and corporations like mine have to retain a competitive leadership throughout the United States and throughout the world." The job placement rate in community colleges is very impressive; community college leaders indicated that the vast majority of the graduates obtain employment.

On the other hand, however, the graduation rate is not impressive. In actuality, the graduation rate for community college students in postsecondary technical degree programs is less than 40 %. The low percentage may be attributed to: (a) part-time enrollment of non-traditional students, (b) students transferring after one year to a four-year college or university, and (c) students being employed in their career area before graduation and deciding not to complete the degree requirements

The question surrounding institutional responsiveness, concerning the quality of programs in community colleges, may be best expressed by two of their famous graduates, Kweisi Mfume, President of the National Association for the Advancement of Colored People (NAACP) and Norman Rice, former mayor of Seattle. Mr. Mfume stated "my tenure at CCB (Community College of Baltimore) was undoubtedly one of the most memorable times of my life. It was there that I began to stop dreaming about the goals I would achieve and instead set forth a plan to make them happen." Another famous graduate, Norman Rice, former Mayor of Seattle, stated "community college prepared me and gave me the confidence I needed…community colleges are a great bridge, a bridge from high school to college, from welfare to work…"

IMPLICATIONS

Although the case studies were oriented entirely to the needs and idiosyncrasies of the Commonwealth of Pennsylvania, they have international implications for the ways in which postsecondary technical education programs in community colleges and two-year proprietary institutions are managed and delivered. As leaders in IVETA, we know that a well-educated and technically trained workforce is essential to the growth and development of a nation. Moreover, global competition in the marketplace will intensify the demand for all nations to possess an increasingly competitive workforce. The high performance demands of the new millennium and the rapid technological changes in the workplace dictate a need for technically skilled workers with high-tech employability skills.

The results from this study may help educational leaders and policymakers who frequently make more informed decisions regarding the future of educational programs based. For example reliable data regarding graduates and their job placement and rate, graduation rate, and the overall quality of their respective programs would be useful data for educational leaders in the global marketplace. Moreover, the results from this study may stimulate the thinking of business and educational leaders in the global marketplace with policy ideas to develop a management information system to assist employers with personnel management decisions regarding recent graduates of postsecondary technical programs.

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GLOBAL E-LEARNING
TENDENCIES AND POSSIBILITIES OF USING THE INTERNET FOR VOCATIONAL AND EDUCATIONAL TRAINING

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Index: Distance learning, Web based training, Learning platforms

Abstract: The Virtual Training Center (VTC) integrates the ideas of media-based learning environments into the idea of the learning platform which has increasingly influenced theoretical discussions at international congresses (e.g. Learntec 2000, Karlsruhe, see www.learntec.de).

The VTC simulates a training center in the web and serves as a platform of internet or intranet based courses and self-learning media. Seminars and workshops can be held, media and documents can be worked on and administered and know-how can be exchanged.

The basic idea of the VTC is to create a web-based infrastructure which shelters all possibilities of web-based teaching, learning and training.

INTRODUCTION

In the age of the internet, the term "learning environment" embraces a new dimension.

The system presented in the following tries to meet the conditions made on an internet-based teaching, learning and induction system.

According to Peter Strittmatter/Helmut Niegemann („Lehren und Lernen mit Medien", page 7 ff, page 138) a system must have the following functionalities:

1. Teaching function
2. Interactivity
3. Adaptivity
4. Self-control
5. Modalities

1. BASIC MODULES

1.2 The Entrance

After the learner has logged in, the entrance of the VTC appears.

The individual rooms can be entered with a mouse click.

An information board shows the current seminars and workshops. The individual courses can be selected from here. With a mouse click the Participant jumps directly into the auditorium.

1.3 The Assessment Center (AC)

With the help of the Assessment Center the demand for training and further education of individual employees, work groups or entire organizations can be assessed. Here, tests can be implemented which can be evaluated and analyzed by the system.

Furthermore, there is the possibility of recommending to individual employees or groups the participation at seminars or the use of teach-yourself media within the VTC. The contents of the Assessment Center are to be developed and implemented with regard to the specific demand, they are not included in the Basic Module.

1.4 The Auditorium

In the Auditorium the speeches and presentations are given.

On the screen a Video Window, a Media and Document Window and a Discussion Window appear which fulfill the following functions:

- **Video Window**

  Here the trainer or presenter giving his speech is shown by video.

  Below the Video Window there is the control bar which enables the functions „start", „stop", „forward" and „back". After the presentation the video is transferred into the Folder of the learner (see 3.1 for function of the Folder).

- **Media and Document Window**

  At the right side of the Video Window there is the Media and Document Window.

  Here the text and graphic documents revised by the presenter are shown; they can be transferred to the Folder as well.

- **Discussion Window**

  The Discussion Window is placed below the Video Window and the Media and Document Window. In the Discussion Window, the course of the presentation is documented in form of brief notes; also documented are the discussion contributions (Q&A's from the presenter as well as the learner).

The speech can be summarized by the Trainer and be shown in the Discussion Window with the accompanying documents. These will be seen as icons. The Participant can choose to view the documents or to transfer them to his Folder (see 3.1). The documents can be processed further with the Office applications.

Furthermore, there is the possibility of putting individual hyper links into the key words of the notes, which connect to stored documents, explanations or contacts as well as further web sites in the library. Questions and comments of the participants are represented here as well.

The Discussion Window also shows the state of the Trainer and Participant. The following is stated:

The Trainer's and the other Participants'

- presence
- absence
- activities (e.g. would like to ask a question or is sending a document).

1.5 Self-learning Center (WBT)

In the Teach-yourself Center, the learner can work with media like Computer Based Training (CBT) or Web Based Training (WBT). The use of the media can be on line in the web or off line with a download. The media are administered in the WBT. The Administrator, Trainer and Participant have numerous evaluation possibilities such as access, duration of use, results of study or state of study.

The media are to be developed according to specific demand and are not included in the Basic Module.

1.6 The Evaluation Center (EC)

The Evaluation Center enables the learner to check his knowledge. Tests and exercises which are evaluated by the system provide information about the learning success and knowledge deficits.

The individual tests and exercises are to be developed in regard to the specific demand and are not included in the Basic Module.

2. ADDITIONAL MODULES

2.1 The Team Center (TC)

The Team Center is meant for group work in the VTC. The TC is divided into sections in which individuals or groups can work on their tasks.

In the left window the members of one's own group and the other groups are represented as „placeholders", i.e. the presence of the group members are presented graphically (symbol, photo or picture of the member). On clicking on a placeholder a window opens in which the team member is presented briefly (e.g. name, telephone number, division, place, function, address, photo). Apart from the team members, the Trainer can also enter the Team Center. It is possible for him to follow the discussions and tasks and to intervene in individual processes if necessary.

2.2 The Simulation Center (SC)

The Simulation Center enables and supports the work with virtual and/or real instruments or equipment. One can use in practice what one has just learned.

The contents and the virtual instruments or equipment are to be developed with regard to specific demand and are not included in the Additional Module.

2.3 The Coaching Center (CC)

In the Coaching Center, the learning and transfer processes are accompanied by e.g. curricula or task lists developed separately or by best-practice-solutions stored in the data base.

3. PERMANENT FUNCTIONS

3.1 Basic Functions

3.1.1 Folder

All the Trainer's and learner's documents sent and selected are transferred into the Folder.

When a document is sent, the addressee receives a message (e.g.: You've received a message or a document.).

Apart from information and documents, also tasks and notes as well as electronic documents can be transferred into the Folder by the Trainer or another learner.

3.1.2 Information Board

The Information Board presents all seminars, workshops and documents available in the Virtual Training Center.

They can be selected directly from the Information Board.

The information can concern past courses or be an announcement of future courses. At the same time, information is shown such as names of contacts or documents available for the course. It is also possible to electronically enroll for individual courses from the Information Board.

3.1.3 Information Manager

The Information Manager puts all relevant information at the Trainer's and the Participant's disposal.

Search Functions

- Topic

  e.g. staff, marketing, strategy
- Period of time

  The search can be limited to certain years/months etc.
- Piece of information

  e.g. document, medium, web sites, seminar

A combined search is also possible (e.g. all regulations for bookkeeping in the period of 1997-1998).

Right of access

Trainer and Participant can have different rights of access within the VTC (e.g. participating at a certain course and access to all information in the library). The rights are shown to him via the function „right of access".

News

News on the Training Center can be viewed here.

Schedule

The Schedule presents the individual dates concerning the courses (e.g. day of presentation, submission of interim results).

3.2 Additional Functions

3.2.1 E-Communication Functions

The learner and the Trainer have the following electronic communication functions at their disposal permanently:

- **e-mail**

  for transferring texts and documents

- **e-audio**

  for transferring acoustic information (e.g. as an audio conference)

- **e-video**

  for transferring videos

- **e-document**

  for transferring and jointly working on documents (document sharing)

When a function is selected, a window opens with the relevant application.

The implementation of the individual systems (e.g. video and/or audio conference system) is prerequisite for the E-Communication Functions.

3.2.2 E-Office Functions

The Microsoft Office applications (e.g. Word, Excel, PowerPoint, Access and Project Manager) can be opened via mouse click at any time in order to work on documents.

Prerequisite for the E-Office Functions is the previous installation of the applications on the computers in use.

3.2.3 Presentation Manager

The Presentation Manager is a function for the preparation of the courses and the presentation of results. When the Presentation Manager is selected, a window opens in which the course of the presentation is shown.

Via drag and drop the presenter (Trainer or Participant) can arrange chronologically the documents and media which he e.g. transferred into the Folder.

When presenting, these can now be selected and will then appear in the Media and Document Window of the Auditorium.

At the same time the presenter can enter the notes of his speech, e.g. in form of a structure, and attach the individual documents to the individual notes.

3.2.4 Editing Manager

The Editing Manager enables the Trainer to create contents and exercises in the modules of the VTC. With the Editing Manager exercises can be created in the Evaluation Center which are put at the learner's disposal randomly and evaluated afterwards.

4. ADMINISTRATION OF THE VTC

4.1 Administrator

The Administrator (Supervisor) is responsible for the entire administration of the VTC. His tasks are mainly to administer the data base and supervise the users, as well as supervising the rights of access and servicing the system.

Administering the data base includes the registration and changing of data regarding the participants and trainers, data such as name, user name, password, e-mail address, company, place, function or photo as well as right of access. Moreover, the Administrator supervises the so-called active data, i.e. the data variable over a period of time, e.g. the documents or media for a course or the results as well as the rights of access.

The supervision of the users includes the functional part of the system. Users having problems with accessing the system or the electronic communication have to receive competent help.

Servicing the system includes installing updates and regularly checking all functions so that a flawless use of the entire VTC can be guaranteed.

4.2 Trainer

The Trainer is responsible for the technical contents of the courses and the educational supervision of the learners.

The Trainer logs in to the system with his user name and personal password. According to his current rights of access, he receives certain rights such as access only to his own course and relevant information in the library.

He can store, call up and work on his media and documents in the library. The information is stored via the Central Web Based Data Base in from of a graphic interface. The Trainer can select the media and documents and decide where in the library they are stored.

Via the Trainer's rights of access it is guaranteed that he can only change or complete data in regard to the course within in the library.

4.3 Participants

Just like the Trainer, the Participant also logs in to the system with his user name and personal password. He, too, receives the current rights of access from the Administrator; e.g. he only receives access to a course if he has paid it in advance.

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4.4 Automated Processes

Automated Processes are based on rules which reduce the administration. If, for example, the Trainer invites the Participants to an auditorium meeting, e-mails are sent automatically to the participants and their rights of access are changed in such a way that they will have access to the data and to the planned meeting at the stipulated time.

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A COMPARATIVE STUDY ON THE STRENGTHS AND WEAKNESSES OF THE STUDENTS BETWEEN CHINA AND HONG KONG

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Abstract In August 1999, three lecturers and fourteen students of Zhejiang University of Technology (ZUT) and Hangzhou Institute Applied Engineering (HIAE) were invited by the Department of Electrical & Communications Engineering (EE) of Institute of Vocational & Education Tsing Yi (IVE/TY) coming to Hong Kong for a Student Exchange Summer Camp. Joining the camp were seven year 1 Higher Diploma students from the EE department. The objectives of the camp were three folds: (a) to find out any difference in the command of English for the post secondary school students from China and Hong Kong; (b) to substantiate an effective means for the learning of Putonghu ; and (c) to investigate the practical skills and mentality of these students. A series of activities were organized for the students and their performances in all activities were analyzed to achieve the objectives of the comparative study for these two groups of students.

INTRODUCTION

The fourteen students from the two institutes in Zhejiang province were mainly year 2 students in their respective courses, which was equivalent to a 2-year study after graduating from the six-year secondary school in China. The EE students were all year 1 students, and all of whom had done the 2-year A-level study after graduating from the 5-year secondary school in Hong Kong. This showed that all the participating students had achieved almost the same academic attainment since their schooling. Since these two groups of students could only communicate with each other in either Putonghua or English and they were in the same age group, the situations had provided the needed platform for this comparative study.

During the thirteen-day camp, all activities were carried out on group basis; with two students from China and one student from Hong Kong were put in the same group. The program included English learning classes and tests, Putonghua learning classes and tests, individual presentations, sports, shopping, industrial visits, sightseeing, staying with peers' families, debate, meeting and mini-project competition.

Activities and Purposes of the Study

On the first day of the camp, all students attended the first English attainment test, which included basic grammar, Chinese to English translation, English to Chinese translation, comprehension and writing skills. A second test, with the same areas as the first one, was held again for all students one day prior to the end of the camp. Between the two tests, three 3-hour English learning sessions were conducted, and they were "Pronunciation" and "Misuses of English by Chinese". Of course, the purpose of these English sessions was not meant to improve students' ability in English, but meant to share with them the use of English in the normal ways. The two tests were conducted to ensure the consistency of the results, and the aim was to find out the students' weaknesses and strengths in English.

Again on the first day of the camp, all Hong Kong students were tested for the attainment of Putonghua. The test included two parts; one was a presentation in front of all participants, and the other was a peer group discussion. In the presentation, each Hong Kong student was requested to give a ten minutes talk on any kind of subject, and the topics were mainly self introduction, interesting hobbies and local tourism. Each speaker then responded to few questions raised from the floor. In the peer group discussion, the three students in each group discussed and talked about any topics which they shared common interests. After the test, scores were given to each Hong Kong student for his attainment in Putonghua. In each peer group, the two students from China were the language mentors for the Hong Kong students in the rest of the program, they used Putonghua as the only medium of communication for the activities either held in or off the campus. This kind of enforced and environmentally embedded learning model was repeatedly used to drill the Hong Kong students all day long on the use of Putonghua over the next twelve days. By the end of the program, Hong Kong students were tested again for their attainment of Putonghua after the camp. This time the format of the test was different from the first test and more pressure was on the Hong Kong students. Each peer group conducted a fifteen minutes talk in front of all the participants, and then the Hong Kong student of the group responded to questions raised from the floor. Finally, he was requested to brief the audiences about the camp and what he had learned from it. Apart from the individual peer group, scores were given to the Hong Kong student from all participants. The testing areas for both tests were on pronunciation, fluency, use of words and understanding of Putonghua.

Opportunities for both groups of students to communicate and exchange of views/ideas were amble; through many occasions such as laboratory visits, industrial visits, shopping, touring Hong Kong, preparation for a debate, during meals, singing, sports, peer family visits and mini-project competition etc, students were able to mix naturally and had a free atmosphere to better understand each other.

Three 3-hour sessions of mini-project were organized and had been used to test the students' logical thinking, practical skills, understanding of science, co-operation, mentality/maturity and creativity. The seven peer groups were re-organized into four larger groups for the mini-project competition. Each of the four groups was requested to design and build a toy car and students had to make use of the available building blocks, driving mechanism, interface units and microprocessor supports for their designs. The target was to get the car to complete two separate routes in shortest time. The end result of the project work was not important, but it was through this process that we were able to observe the students' performances and behaviors in the aforesaid areas. The other test, which had similar effect, was the debate competition, but this time students were divided into two groups with one as the "for" group and the other as the "against" group. The major difference between these two events was that one involved practical skill and the other was purely hypothetical work.

Results and Their Meanings

Results of the two English tests[1] revealed that both groups of students were very good in the category of translation from English to Chinese. This was probably due to rich of vocabularies, hence students could do the translation easily. For this part Zhejiang students had better Chinese expressions and better handwriting than the Hong Kong students.

On the contrary, in the category of translation from Chinese to English, students' average performance was 30% worse off than the previous category. The major weaknesses were in lack of vocabulary, misuses of words, and confused structures of sentences, both groups of students had similar weaknesses. The main reason contributing to the poor performance in this area was the lack of reading time on English publications; most of the students had literally not spent any time on non-curriculum English materials at all.

Both groups of students had an average score in English comprehension, although HK students had a slightly better average than their peers did. Apart from the contributing factor as stated in the above paragraph, students were found unable to precisely comprehend the materials and their relate information. The effect would be more pronounced, if the subject matters had been unfamiliar to the students.

Zhejiang students had better performance than their peers did in the category of English grammar. Looking together with the category of writing test, the weaknesses for HK students were more pronounced. They were very weak in using correct grammar and tenses to form sentences, hence the messages were unclear and confusing. Whilst for the Zhejiang students, clearly they had better training in English grammar, and at least rarely made mistakes in simple and short sentences. They committed the same mistakes as the HK students did in writing long sentences; the major mistakes came from incorrectly use of tenses in most of the sentences. The other weakness in writing was the style of sentences; direct translations from Chinese were found in as many sentences as they wrote. Of course the meanings of these sentences would inevitably be ambiguous and confusing, especially to non-Chinese readers.

The biggest reward from the camp to the HK students was the amazing improvement in Putonghua. The results of the two tests[2], before and after the program, showed remarkable improvement in Putonghua for the majority of them. Of course the embedded learning environment was the major catalyst for the learning process, HK students also played a very major role in actively taking part in all the events. Apart from the test results, the improvements could be easily seen from their involvement in debate, project work and meeting. From the self introduction session in the first day of the camp, where they could hardly express any meaningful sentences in Putonghua to the meeting session in the last day, where they could talk freely about their feelings. In fact the results has been anticipated because the department has a strong belief that embedded approach is a proper way to learn a language.

On mini-project work, where required practical skills and sense of engineering, HK students were found superior as compared to their peers. Zhejiang students were good in designing the outlook of the car and some of them were also good in computing programming. But on practical work, they had very little and limited ideas on how to make things work. However, they were quick to learn and responded very well to challenges.

Other observations from this Student Exchange Summer Camp were: (a) Zhejiang students had higher anxiety to learn and were more serious about learning than their HK counterparts; (b) HK students tended to obey rules and were better in time keeping; (c) Zhejiang students had received more thorough education, whilst HK students were only good in technical subjects; and (d) HK students were more independent, whilst Zhejiang students tended to rely on supports from others.

CONCLUSIONS

EE department financed the whole operation of this Student Exchange Summer Camp, and for this reason the student sample could not be too large. The small group size might have affected the accuracy of some investigative results. However, the preliminary results from the targeted activities were found useful and encouraging, which is worth further and wider investigation. The comparative study has revealed many areas, which educators need to pursuit for the betterment of student quality, and more effective teaching methodology. The weak areas, which have been suggested from the study, are:

(a) Poor English communication skills in speaking, understanding and writing. The problems lie in lack of practice and an environment for students to get training.

(b) Insufficient education on sense of responsibility and work attitudes. Many students had shown some degree of lack of commitment because they did not have the concepts of being responsible and behaving with proper attitudes. Students would not be 100% learning, if they do not get the concepts right in their minds.

(c) Zhejiang students have to strengthen their practical skills and sense of responsibility,

whilst HK students have to strengthen their language skills and be more committed to study.

Further Study

An astonishing fact has been revealed during the camp, the Chinese students had equal, if not better, English standard as the HK students did. But the fact is that the former group of students only started learning English from their first year in secondary schools, while HK students all learned English since their kindergarten years. This area is worth further investigation in the wake of finding a right approach for the teaching and learning of a second language.

With the success that the camp has achieved in Putonghua, a broader study on this embedded approach to help learn English is recommended. Learning in class can only help students to memorize the rules and skills of a language, but an embedded environment can help students to practice and own the results from it.

The other fact also revealed during the camp was that learning an engineering subject could be more beneficial through work base approach. Students were given a project and, through trials and tests, they learned the technology much faster and in a more useful way, which helped them to remember for rest of their lives.

Note 1:Results of English Tests

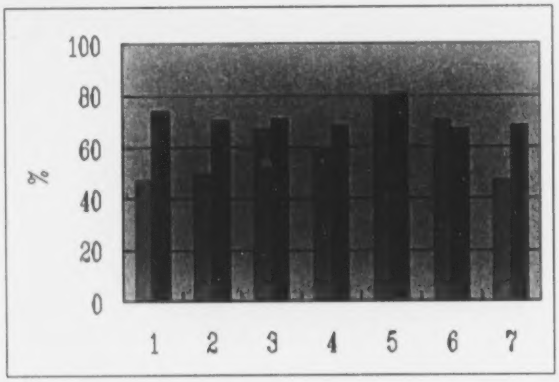
	1	2	3	4	5
	English to Chinese	**Chinese to English**	**Comprehension**	**Grammar**	**Composition**
HK Stdts	**98**	**68**	**80**	**63**	**66**
Zhejiang	**100**	**72**	**68**	**77**	**69**

Results of the First Test

	1	2	3	4	5
	English to Chinese	**Chinese to English**	**Comprehension**	**Grammar**	**Composition**
HK Std	**95**	**64**	**58**	**61**	**65**
Zhejiang	**97**	**62**	**52**	**71**	**72**

Results of the Second Test

Note: 2 (Test results of Putonghua)



Left: The results of first test in Putonghua
Right: The results of second test

#1 student:	Attended 3-year Putonghua in primary school and took a short course
# 2, 6 & 7 students:	Attended 2-year Putonghua in primary school
#3 student:	Attended 3-year Putonghua in primary school
#4 student:	Parents speak Putonghua, but he never attends any class.
#5 student:	Brought up in China, and knows Putonghua

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NEW DESIGNS FOR CAREER AND TECHNICAL EDUCATION PROGRAMS AT THE SECONDARY AND POSTSECONDARY LEVELS IN THE UNITED STATES: CONTEXT, AUDIENCE, SIGNATURE, AND EXPECTATIONS

George H. Copa, Professor, Oregon State University,
Sharon K. Grossbach, President, Hennepin Technical College

Abstract: This paper will address new directions for career and technical (vocational) education in the United States at both the secondary and postsecondary levels of education. The work is a part of the program of work of the new National Center for Career and Technical Education and funded by the U.S. Department of Education. Focus will be on the context of career and technical education (i.e., assets, problems, opportunities, and aspirations), audiences to be served, signature (i.e., unique purpose), and desired learning expectations/outcomes. Special attention will be given to the changes needed in career and technical education in light of major educational reform initiatives at the secondary and postsecondary education levels in the United States. These reforms include new academic standards, integrating vocational and academic learning, more closely linking school and work-based learning, connecting secondary and postsecondary education programs, and new accountability requirements. The first part of the paper will focus on the New Designs for Career and Technical Education project and present a descripiton of the design process and preliminary recommendations resulting from a review of research and best practices and deliberations by a National Design Group representing administrators, teachers, counselors, teacher educators, researchers, and business and industry. The second part of the paper will present an application of the design process and resulting recommendations to a specific career and technical education institution in the United States – Hennepin Technical College.

Part 1: New Designs for Career and Technical Education[1]

The purpose of this project is to develop new designs for career and technical education at the secondary and postsecondary levels in the context of New Designs for the Comprehensive High School (Copa and Pease, 1992; Copa, 1999) and New Designs for the Two-Year Institution of Higher Education (Copa and Ammentorp, 1998). Both of the latter were products of the National Center for Research in Vocational Education at the University of California, Berkeley. These projects were focused on whole high school and community/technical college reform and incorporated the results of research and best practice including integration of academic and vocational education, articulation of secondary and postsecondary education, and coordination of school and work-based learning. With this foundation, it is now appropriate to draw out specific implications for the design of career and technical education in terms such as learning context, learning audience, learning signature, learning expectations, learning process, organization, staffing, partnerships, and learning environment. Both practitioners and researchers will be actively involved the design process.

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[1] This statement was drawn from the ongoing work of the project, New Designs for Career and Technical Education at the Secondary and Postsecondary Levels, which is a part of the program of work of the National Research Center for Career and Technical Education headquartered at the University of Minnesota and funded by the Office of Vocational and Adult Education in the U.S. Department of Education. This project is being directed at Oregon State University, a partner institution in the National Center. The Project Director is George H. Copa, Professor, School of Education, Oregon State University. ,Sharon Grossbach, President, Hennepin Technical College serves on the National Design Group for this project.

Rationale, Need, and Relevant Literature

The need for this project is clearly evident in the changing context for education and workforce development in the United States. The educational changes include the impact of: (1) new, high priority academic standards across the states for secondary education (U.S. Department of Education, 1992, 1995; U.S. General Accounting Office, 1993; Boesel & McFarland, 1994) (often resulting in a reduction of opportunity and enrollments in career and technical education and a changing role for career and technical education as a pedagogical method for teaching academics in addition to its role as a content area/subject matter field), (2) several years of sustained initiatives and funding for the integration of academic and career and technical education (Bottoms & Sharpe, no date) (often resulting in new forms of career and technical education and multiple and sometimes conflicting expectations for career and technical education), (3) several years of initiatives and funding for School-to-Work system improvement (Stern, Finkelstein, Stone, Latting, & Dornsife, 1995; Hartoonian & Van Scotter, 1996) (resulting in increase attention to work-based learning and linkages to school-based learning with implications for the learning process, organization, and staffing of career and technical education), (4) shifting focus of accountability in community and technical colleges to outcome-based learning with emphasis on the more general education skills (U.S. Department of Education, 1992, 1995; U.S. General Accounting Office, 1993; Boesel & McFarland, 1994) (resulting in concern about the role of, priority for, and organization of career and technical education in postsecondary education), (5) recognition of need for formal lifelong learning and value of transfer of learning (and credit) from high school to community college and community college to university (Hansen, 1994) (resulting in new partnerships in career and technical education), and (6) new vocational legislation (U.S. Congress, 1998) requires states to revisit the definition and meaning of career and technical education in the context of the changes noted above (resulting in widespread conversation and interest in strategies for program improvement and accountability).

At the same time, there are major changes being called for in workforce development in the United States including the need for: (1) new basic skills (Secretary's Commission on Achieving Necessary Skills, 1991, 1992, 1993), (2) broad employability skills (Secretary's Commission on Achieving Necessary Skills, 1991, 1992, 1993), (3) all aspects of the industries (U.S. Congress, 1998), and (4) national industry skill standards (Lee, Casello, May, Foster, Goodwin, & Meeham, no date; Hoachlander & Rahn, 1994; Oliveir, 1995; National Skill Standards Board, 1996). These challenge career and technical education to develop new designs for its learning expectations, learning processes, organization, and finance.

Objectives

The objectives of this project are to:

1. Draw out the implications for career and technical education of the design recommendations of New Designs for the Comprehensive High School and New Designs for the Two-Year Institution of Higher Education and its applications and recognition around the country (e.g., acknowledgement by accreditation agencies as innovative approach to planning institutional improvement, use by the American Institute of Architects as the criteria for selection of award winning K-12 and community/technical college designs, selection of schools applying the design principles as New American High Schools)
2. Conduct a comprehensive review of research and promising practices in career and technical education using a format that can be used by practitioners and easily updated.

3. Involve researchers and practitioners in the development and synthesis of new designs for secondary and postsecondary career and technical education (and the interface between secondary and postsecondary educational levels).
4. Describe new designs for career and technical education in terms of the design elements of learning signature, audience, expectations, processes, organization, partnerships, staffing and staff development, environment, finance, celebration, and accountability.
5. Disseminate and provide technical assistance on new designs for career and technical education.

During 2000, the above objectives will be accomplished for the design elements of Learning Context, Audience, Signature, Expectations, and Learning Process. During 2001 the project will focus on Learning Organization, Partnerships, Staffing, Technology, Environment, Celebration, Accountability, and Finance for career and technical education at the secondary and postsecondary levels.

The contributions of the project will provide new formats and structures for career and technical education in the United States grounded in whole school and college reform and the latest research and promising practices. These new designs will be important and central to the improvement of career and technical education in the United States.

Summary

This part of the paper has provided a description of the design process that is and will continue to be used to develop a new designs for career and technical education in the United States over the next three years. Preliminary recommendations will be provided for the first two of ten design elements – Learning Context and Learning Audience. We next turn to an application of the New Design process (the same elements and general process) which was made earlier to a specific career and technical institution – Hennepin Technical College located in the State of Minnesota. This application and others of the original research and development efforts on New Designs for the Comprehensive High School and New Designs for the Two-Year Institution of Higher Education formed the bases for the new national project, New Designs for Career and Technical Education, as describe above.

Part 2: Hennepin Technical College -- An Application of the Design Process and Resulting Recommendations

Hennepin Technical College is the largest two-year technical college in the Minnesota State Colleges and Universities system of 36 colleges and 53 campuses. Located in suburban Minneapolis, the college was founded in 1972. College programs and services are offered at two campuses and two other locations and hundreds of business and industry sites. Hennepin Technical College enrolls approximately 6,000 post-secondary students, 1,800 high school students, and over 10,000 customized training students annually. The College's revenue budget is $35 million.

The mission of Hennepin Technical College is to provide quality technical education needed for employment in an ever-changing, global work environment. Hennepin Technical College fulfills its mission by offering Associate in Applied Science degrees, diplomas, and certificates in occupational fields that do not require a baccalaureate degree for entry. The College facilitates lifelong learning by offering programs which are specifically designed to expand the knowledge and skills needed by adult learners for job retention, enhancement, or advancement. The College offers flexible and non-traditional evening and weekend classes along with its daytime schedule.

New Designs Planning

During the 1996-1997 school year, a planning process was undertaken to coordinate and support the development of an overall design to continually improve Hennepin Technical College and strategically position it for the future. The planning process lead by the President was done by a design group of 46 individuals who represented key college and community stakeholders. Participating in the group from the college were administrators, faculty, support staff, and students. In addition, over 20 community members served as members of the design group. Another 35 community members were interviewed individually or participated in focus groups. Organization and groups, which were represented, included K-12 post-secondary schools, heads of business and industry, members of labor organizations, interested citizens, and representatives from community-based organizations. The design process addressed Hennepin Technical College's learning context, learning signature, learning outcomes, learning process, learning organization, learning partnerships, learning teams and team development, learning environment, learning finance, and learning celebration.

The Design Group formulated the following design criteria to guide the development of the design specifications for each of the elements that follow in the design process:

- Improving focus on and responsiveness to learners
- Increasing the number and new forms of partnerships
- Improving access to services
- Maintaining and improving dedication and quality of a diverse faculty and staff
- Enhancing public opinion and awareness of HTC
- Identifying and making appropriate investments in core programs/skills
- Improving funding for technical and related training
- Improving flexibility to deal with changing context
- Improving attention to accountability for learning and the institution.

Creating a Change Oriented Culture

"Succeeding at comprehensive changes entails more than thinking and discussing; it requires action" (Eckel, Green, Hill & Mallon, 1999). Eckel et. al. continue by suggesting that for an institution to succeed with change widespread institutional participation must occur. A wide range of people must see themselves benefiting and change must make sense on campus.The New Designs change initiative at Hennepin Technical College has been successful because it has tapped the human resources of the whole college. Collaborative efforts and leadership have produced results.

The implementation of the New Designs began immediately following the release of the design team report in August 1997 at an all-staff workshop. The plan was launched as part of a college learning celebration. Faculty and staff were encouraged to get involved, take risks, and think "outside the box." In 1997 Hennepin Technical College changed its organizational structure to reflect the learning team concept that evolved from the New Designs process. The academic affairs structure formed into learning teams, a more interconnected arrangement with faculty as leaders. The process has taken time, support, and education. The leadership is emerging from all levels and examples of "New Designs" actions are occurring constantly. During the three years HTC has been implementing New Designs the College has become more focused on student learning, strengthened shared values and trust, and invited active involvement in College leadership by all employees.

Summary of Progress

In January and February, 2000 Joyce Simon, Consultant, conducted New Designs workshops that were attended by a total of 85 participants. The sessions were held on both campuses. One of the purposes of the workshops was to review employee perspectives of New Designs and profile root and is growing. It is action, not theory. It has become part of the daily life of the College and the people who work here." (Simon, 2000). Simon also observed that in workshops she conducted 2 years ago she heard fears expressed about what New Designs was "going to do." Now she was finding more of a fear that it would go away and that staff indeed wanted to continue New Designs. Simon concluded from her study that she has observed a remarkable transformation and feels the New Designs approach is here to stay and may become the hallmark for HTC. Her report summarizes the following strengths:

1. The learning teams seem to be working well. Whether groups meet often or infrequently, it seems to be just right for the team members.
2. The president's leadership has been key to making New Designs work. In many organizations, the philosophy is espoused but trust and effort are lacking. Not here.
3. Competition between departments or programs is giving way to cooperation.
4. Team members appreciate having more autonomy. They appreciate being a part of the decision making on team expenditures.
5. The staff throughout HTC system is friendly, helpful, and supportive to colleagues new and old.
6. Key awards (staff recognition) are viewed positively as a means to recognize colleagues.
7. There have been and continue to be technology improvements.
8. Overall morale has improved and is positive.
9. Budget and finance issues are better understood and information is more available than ever before.
10. Staff remains focused on the needs of the students. (Simon, 2000)

The culture at HTC since New Designs has shifted to one of strong trust among all groups of employees. This is especially evidence between administration and faculty. As a result more creative approaches to program offerings have occurred. Risk taking and entrepreneurship is encouraged. Improved technology and more team-work has improved communication within the College and to the external community as well. Training and assistance with technology has also enhanced the work of individual employees.

On Going Opportunities

New Designs has taught the College to listen carefully to internal and external customers. As a result of listening to the needs of internal customers the College is moving ahead to create new tools to continue to implement New Designs thinking. The following guides will be available in August, 2000:

- **New Designs Guide for Better Communications:** the tools available at HTC
- and the best way to use them.
- **New Designs Guide to Marketing:** update on current and planned marketing
- activities, who's who and what's what in HTC marketing.

- **New Designs Guide on Teams:** how to organize and operate a successful team
- **New Designs Guide for Daily Use:** old versus new thinking
- **New Designs Guide for Action:** stirring up results from your ideas.
- **New Designs Guide for Team Participation:** how can I be involved in helping
- HTC reach its potential.

Just as there is no definitive end point to the change process on campus (Eckel, Green, Hill, & Mallon, 1999) this report of New Designs has no conclusion. The challenge now is to sustain the momentum, to keep New Designs fresh and vibrant and to continue to discover the powers and possibilities of continuing the implementations (Simon, 2000).

Hennepin Technical College has moved to new levels of transformational change in the past three years. This change exhibits the dimensions of both depth and pervasiveness. It has touched the college in deep and meaningful ways (Eckel, Green, Hill, & Mallon, 1999).

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DETERMINING WHAT MATERIALS TO DEVELOP

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Index: Curriculum/ Instruction/ Design/ Development/ Learning/ Performance

Abstract: How do you determine what materials to develop? By using a new model that is so efficient and effective, it practically guarantees the production of relevant high-quality CBE materials at the lowest possible cost. The SCID model was carefully developed to incorporate the critical tasks needed to develop the kinds of CBE curriculum and instructional materials needed to train tomorrow's work force today. Twenty-three components—a few optional but most essential—are grouped into five phases: Curriculum analysis, Curriculum design, Instructional Development, Training Implementation, and Program Evaluation.

This model has been used since 1990 to train over 1000 curriculum specialists, and training and development specialists from schools, colleges, companies, and government agencies, domestically and internationally. SCID is a process that works!

INTRODUCTION

The development of curriculum and instructional materials for CBE is a costly and complex process involving many critical tasks. The failure to properly carry out anyone of these tasks can jeopardize the entire instructional development effort. The importance of the process demands that appropriate and effective procedures be used so as to guarantee the production of relevant, high quality materials. Further, the high costs involved require that the most efficient time and money saving approaches available be utilized.

To provide some structure to this very important process, an efficient and effective model has been devised. Known as SCID or the Systematic Curriculum and Instructional Development model, it consists of five phases and 23 components (Norton, 1990). The five-phases are (1) Analysis, (2) Design, (3) Development, (4) Implementation, and (5) Evaluation. See Attachment A for a graphic representation of the model.

Analysis Phase

Analysis is where it all begins. The **needs analysis** component of this phase is where the actual need or needs are determined. The need may be a need for training, for a change in management or production procedures, for new equipment, updated technology, or a combination of these. If the need for training is confirmed, them some type of **job or occupational analysis** is called for. While the observation and interview techniques used to be extensively used to conduct job analysis, today we strongly recommend the DACUM approach to job analysis because of its many benefits and advantages over all other approaches for most situations. Using DACUM, a comprehensive and high quality analysis can be completed in two days rather than 30 or more days required by most methods.

Following the job/occupational analysis procedure, we highly recommend that task verification be conducted. **Task verification** can serve several important purposes. To describe two of them, verification can extend the involvement of a few persons in the job analysis to 50, 100, or more expert workers and/or immediate supervisors of the workers. It can also provide an opportunity to obtain valuable decision-making information such as ratings on the "importance" of each task, the "difficulty of learning to perform" each task, and the percent performing each task.

Given the information available from task verification, we are in a good position to select or deselect, as some industry trainers say, the tasks to be included in the education or training program. We also have valuable information which can guide both the instructional development and instructional planning process.

Now we are ready to conduct **standard task analysis**. Task analysis can take many forms, but when properly done, will yield the explicit and detailed information that is needed to develop relevant and technically accurate learning guides, modules, and other types of teacher and student materials. The task analysis of the selected tasks will serve to identify the steps involved in their performance, the knowledge and attitudes required for successful performance, the performance standards (criteria for success) expected by industry, the decisions the worker must make during task performance, and any safety concerns that may need attention.

Design Phase

As the design phase is started, careful consideration must be given to the type of training or education program desired. What learning principles and concepts will be embraced, and what type of student and teacher learning materials (e.g., learning guides, modules, lesson plans, job aids) will be most effective and cost efficient?

The task performance information collected during analysis is used to specify, in measurable terms, the job skills, knowledge, and attitudes the educational or training program will develop in the learner. Decisions are also made about the type of instructional program to be developed; a fully competency-based one, a more traditional one, or perhaps something in between (Norton, 1988 and Sinnet, et. al,-1990). Decisions also need to be made about the amount of individualization of instruction to be offered, the amount and type of supportive media to be developed.

Measurable learning objectives are developed for each task or group of clustered tasks. Written tests and criterion-performance tests are developed so as to allow for valid and reliable assessment of the learner's reference achievement.

During this phase decisions are also made regarding the training setting or settings most appropriate, student/trainee entry-level qualifications, and the sequencing of learning objectives. The design phase concludes with the preparation of a training plan. The training plan will include information about such things as: (a) the selection and recruitment of learners, (b) the selection and/or training of faculty, (c) instructional facility needs, and (d) the tool, equipment, supplies, and materials needed. The implementation of the training plan begins upon its completion so that the necessary preparations can be made concurrently with the development phase.

Development Phase

The development phase results in the production of whatever instructional materials, including media, were decided upon during the design phase. The materials must be developed so as to help the learners achieve the performance objectives in the most efficient, effective, and economical way possible. Emphasis should be on maximizing the use of existing materials and resources whenever possible. Teacher/instructor and student/trainee activities are designed using the learning objectives and performance measures developed during the design phase as a foundation to guide the process.

In competency and performance-based programs, the instructional materials typically take the form of competency profiles, learning guides, and/or modules. The more traditional education and training programs usually produce curriculum guides, courses of study, and lesson plans.

In most of the development work done for companies and government agencies, sponsors have elected to develop learning guides. As compared with modules, learning guides are usually smaller, 15 to 30 pages versus 40-60 pages for modules, and therefore, much easier to develop. Learning guides usually refer to one or more external resources while modules are usually self-contained. Both types of learning packages contain performance and enabling objectives, and consist of learning experiences that present information, practice/application activities, self-check/model answers, and conclude with a performance test. They are suitable for individual, small group, or classroom use. See Attachment B for a learning guide graphic illustration.

Whatever the type of materials being produced, it is usually advisable to also produce some type of media. The type of media to be developed will depend on many factors including the resources available, the nature of the learning, the skills of the developers, and the equipment and time available.

Implementation

Implementation involves putting the education or training program into actual operation. Work begins by activating the training plan developed in the design phase. Learners have been recruited, instructors selected and trained, and the availability of facilities, supplies, equipment, and other resources is confirmed.

After pretesting, the training is conducted as planned and learner performance is evaluated with both progress and posttests. Instructor performance is also assessed. The evaluations serve to verify that the learners have achieved the performance objectives and to identify any instructor performance problems that need to be remedied. Formative evaluation data is collected from the students and the instructor and used to make in-course corrections as necessary. The results of instruction are documented in the form of student and instructor performance records. Student/trainee competency achievement profiles are used to report to managers, parents and concerned others.

Evaluation Phase

While formative evaluation was conducted during the course of the instruction, it is extremely important at this juncture to conduct summative evaluation. By gathering data on the overall instructional process, on the program outcomes, student follow-up data, worker productivity data, and cost effectiveness data; evaluation can generate decision-making data to help maintain and improve the education or training program. The summative data collected must be carefully and appropriately analyzed and interpreted. Recommendations regarding the program improvements needed then are made and decision-makers are encouraged to take any necessary corrective actions. Completing the evaluation phase produces the performance data and feedback vital to any education and/or training system concerned with quality management or justifying its existence to management.

SUMMARY

The SCID model represents a curriculum and instructional development process that has repeatedly worked very well for many community colleges, companies, and government agencies. The most frequently developed material has been the learning guide because of its ease of development and effectiveness for individual, small group, or large group use. We suggest you try both the SCID model and the development/use of learning guides.

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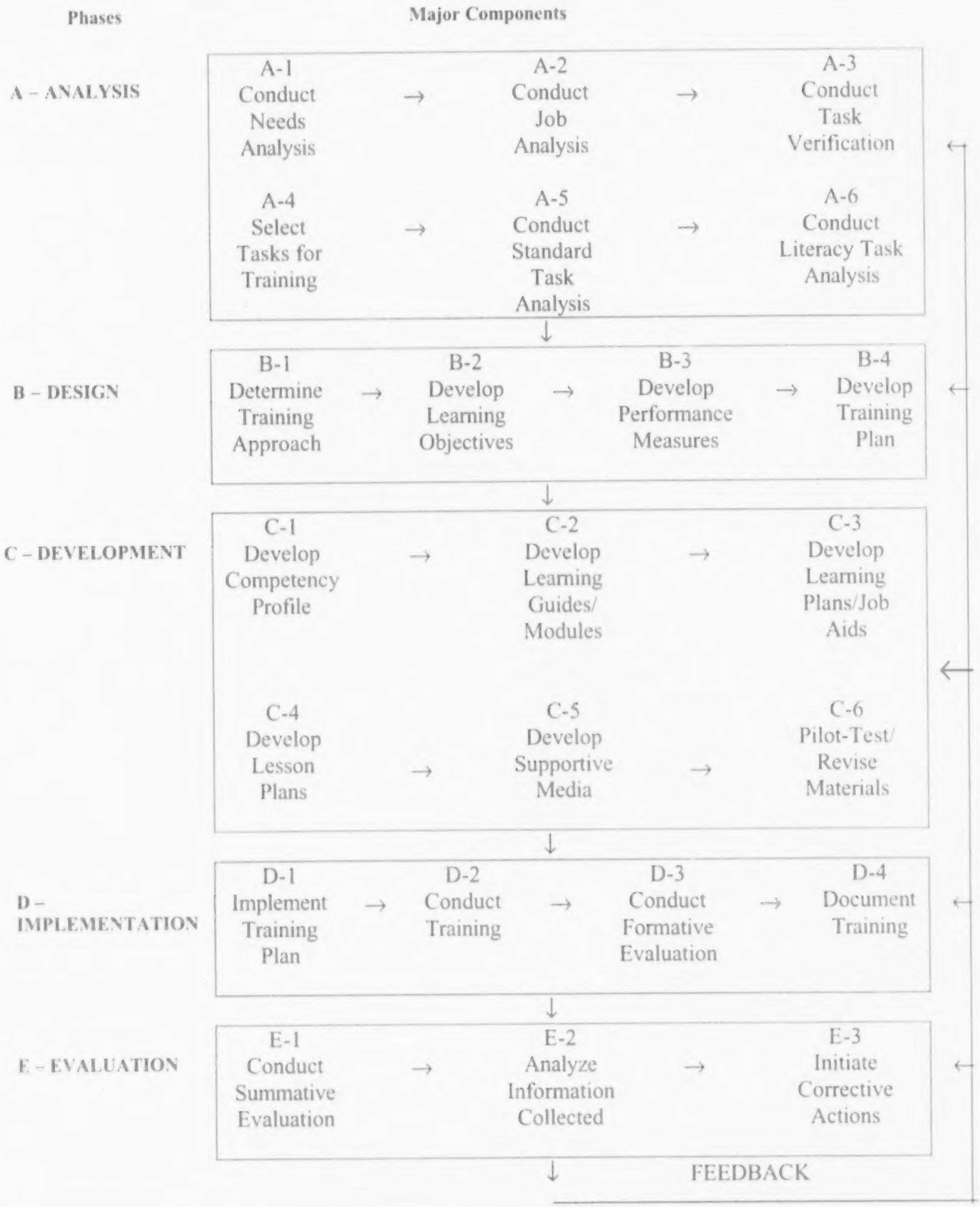
ATTACHMENT A

SYSTEMATIC CURRICULUM AND INSTRUCTIONAL DEVELOPMENT (SCID)



Phases	Major Components					
A – ANALYSIS	A-1 Conduct Needs Analysis	A-2 Conduct Job Analysis	A-3 Conduct Task Verification	A-4 Select Tasks for Training	A-5 Conduct Standard Task Analysis	A-6 Conduct Literacy Task Analysis
B – DESIGN	B-1 Determine Training Approach	B-2 Develop Learning Objectives	B-3 Develop Performance Measures	B-4 Develop Training Plan		
C – DEVELOPMENT	C-1 Develop Competency Profile	C-2 Develop Learning Guides/ Modules	C-3 Develop Learning Plans/Job Aids	C-4 Develop Lesson Plans	C-5 Develop Supportive Media	C-6 Pilot-Test/ Revise Materials
D – IMPLEMENTATION	D-1 Implement Training Plan	D-2 Conduct Training	D-3 Conduct Formative Evaluation	D-4 Document Training		
E – EVALUATION	E-1 Conduct Summative Evaluation	E-2 Analyze Information Collected	E-3 Initiate Corrective Actions			

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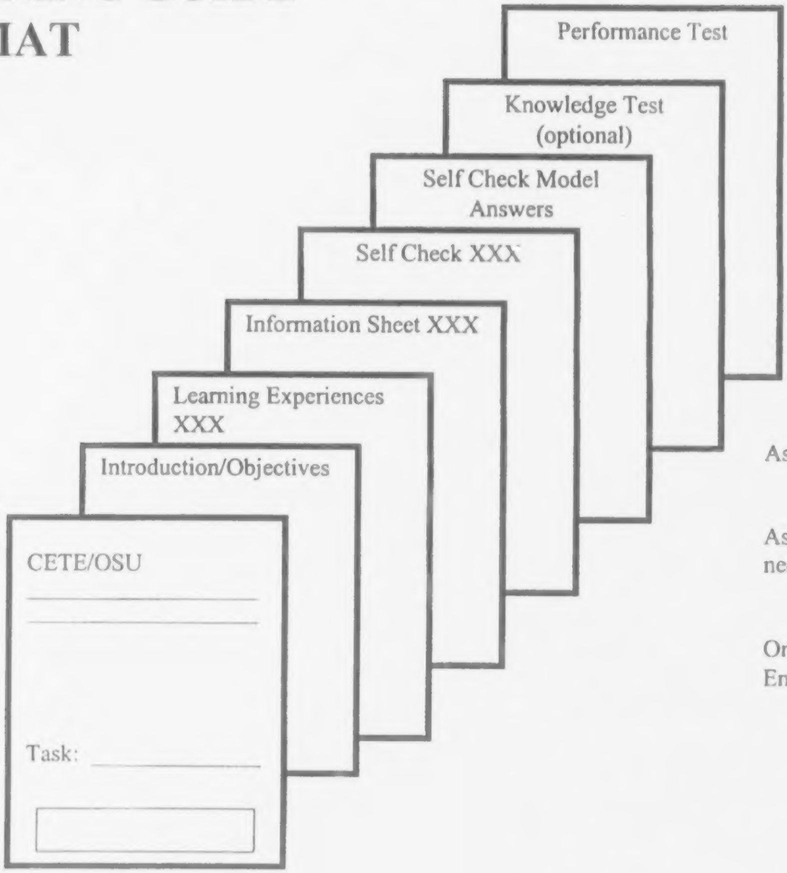
ATTACHMENT B

LEARNING GUIDE FORMAT


Performance Test
Knowledge Test (optional)
Self Check Model Answers
Self Check XXX
Information Sheet XXX
Learning Experiences XXX
Introduction/Objectives
CETE/OSU
Task:

As many Self Checks as necessary

As many Information Sheets as necessary

One Performance and as many Enabling Objectives as necessary

DETERMINING WHAT TO TEACH

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Index: Analysis/ Experts/ Duties/ Tasks/ Skills/ Behaviors

Abstract: Managers and supervisors in all work and educational settings need accurate job information to support data-based decision making. The DACUM (Develop A Curriculum) job/occupational analysis process has been used to conduct over 500 workshops for various educational agencies, businesses and industries, and state and federal agencies. It is a very effective, quick and low-cost process for precisely identifying the duties and tasks performed by expert workers. Most trainees are from community college, companies, and government agencies around the United States and more than 25 other countries.

Given an accurate and detailed description of what experts do, a school, college, company or government agency has a solid basis for training others to do the same. One writer described DACUM as a process for "cloning your best workers." In addition to training and curriculum development, the process provides excellent data for management decision-making, career planning, needs assessment, test development, job redesign, performance evaluations, and quality control planning.

INTRODUCTION

How do you determine what will be taught in your education and/or training programs? Is there a big gap between what is offered learners in the classroom/lab and what is going on in the real world of work? Many have estimated the learning gap to be 50% or higher in some programs. Regardless of your setting—school, college, business, industry, or government agency—determining what skills, knowledge, and worker behaviors will be taught is very serious business.

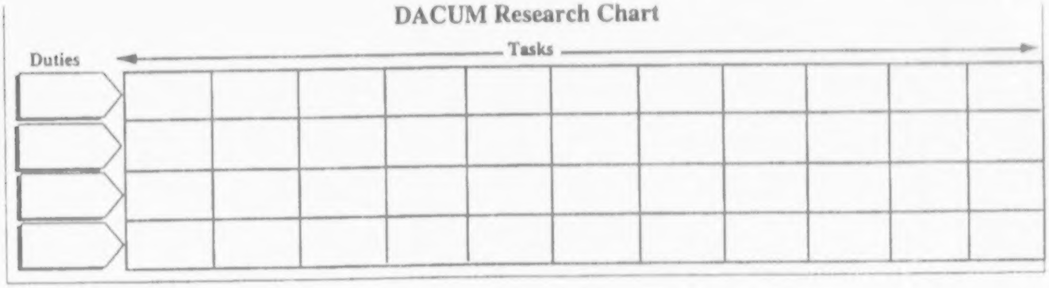
Without an accurate determination of content, two major critical and costly errors are likely to occur. Known as the "Curriculum What Errors" they include failing to teach **what should be taught** (the latest skills and techniques) and teaching **what should not be taught** (outdated skills and information). (Norton, 1997).

As one can imagine, both errors negatively and seriously affect the student or worker's job preparation. This type of learning gap or inadequacy can jeopardize the individual's employment, affect the company's success, and even reduce the economic well-being of the community.

Fortunately, there is an effective, quick, and low cost process available for significantly reducing the "curriculum what errors" and avoid "cheating the learner." It is called DACUM (Developing A Curriculum).

Quality Instruction for the High Performance Workplace: DACUM

DACUM is an acronym for **Developing A Curriculum** (Adams, 1975). DACUM as used widely today is a unique, innovative, and very effective method of job, and/or occupational analysis. It is also very effective for conducting system and process analyses. The DACUM analysis workshop involves a **trained DACUM facilitator** and a **committee of 5-12 expert workers** from the position, occupation, or other area of analysis. The profile chart that results from the usual two-day workshop is a **detailed and graphic portrayal of the duties and tasks** performed by the workers involved.


DACUM Research Chart

In addition to the development of precise duty and task statements, lists of the general knowledge and skills, worker behaviors, tools/equipment/materials/supplies, and future job trends/concerns are also identified.

DACUM is based on three logical premises (Norton, 1997):

1. **Expert workers can describe and define their job/occupation more accurately than anyone else**. Persons who are working full-time in their positions are the real experts on that job. Even though supervisors and managers usually know a lot about their subordinates work, they usually lack the expertise needed for a high quality analysis.
2. **An effective way to define a job/occupation is to precisely describe the tasks that expert workers perform.** A successful worker performs a variety of tasks that either the customer or employer wants performed. Possessing positive attitudes and knowledge alone are not enough. Hence, finding out what the expert workers (top performers) do will give us the opportunity to prepare other experts.
3. **All tasks, in order to be performed correctly demand the use of certain knowledge, skills, tools, and positive worker behaviors.** While the knowledge, skills, tools, and worker behaviors are not tasks, they are enablers which make it possible for the worker to be successful. Because these four enablers are so important, considerable attention is given during the DACUM workshop to identifying lists of each. Because these attributes are different and distinct from the tasks, it is very important to keep them separate if a high quality analysis of job performance requirements is to be obtained.

DACUM has been used very effectively to analyze occupations at the **professional, managerial, technical, skilled**, and **semi-skilled** levels. It has also been used effectively to conceptualize future jobs, and to analyze portions (selected duties) of one's occupation. Recently, with the increasing emphasis on quality brought forth by the TQM (Total Quality Management), ISO 9000, and QS 9000 movements, DACUM also has been used widely as a basis or foundation for analyzing various industrial systems and processes.

There are many reasons for using the DACUM process. The success of any company or organization is always affected by the quality of its employees. To produce and maintain a highly skilled workforce, schools, colleges, and companies must offer the highest quality of education and training possible to prepare present and future employees for the challenges they face.

Accurate and specific job information is essential to good decision-making in all areas of human resource development and management. All of the approaches to quality improvement and management--TQM, ISO 9000, QS 9000, etc. require participating companies to secure and utilize precise and detailed information about their workers roles and responsibilities--work processes, systems, duties, and tasks. **Job/occupational analysis** is the best method available for collecting that type of information. And DACUM is the best means of conducting job/occupational analysis that is available.

Why is DACUM the best method? The excellent quality of the **product** obtained (results) and the superior process used (committee of 5-12 expert workers interacting) are but two of the many important advantages.

The DACUM methodology is widely used in the United States, Canada, and many other countries simply because it is:

- Highly effective
- Quick
- Low cost

The powerful combination of being very effective, quick, and low cost has made the DACUM process very attractive to many schools, colleges, companies, and government agencies. Another important reason for using DACUM has been and continues to be the strong desire of many trainers and educators to establish a relevant, up-to-date, and localized research base for curriculum and instructional development. Clearly, for **educators** a curriculum base that is soundly determined with maximum input from the businesses who are going to employ the students is needed. For **business trainers** and developers, a curriculum base is needed that is specific to the companies needs and that has been developed in such a way as to obtain strong employee buy-in.

To permit any company or educational agency to identify its own localized research base for curriculum development, an alternative to traditional, time-consuming, and costly approaches to job/occupational analysis was needed. DACUM has become that powerful alternative!

Once employers understand what is to be done via DACUM and how the results will be used, it is a rare employer who will refuse to cooperative. Instead, many colleges who have used DACUM report such reactions as the following:

- Offers of equipment (loans and gifts) and supplies
- Offers to host field trips
- Willingness to provide subject matter experts
- Offers of supportive training materials
- Offers of resource persons to help teach in emerging technology areas
- Requests for inservice training programs to meet local industry needs
- Increased enrollments in adult upgrading programs
- Increased support of the educational institution in a variety of ways by local business, industry, labor, and management

While the public relations value of DACUM is secondary to its main purpose, its significant, long-term impact is too important to overlook or lightly dismiss. Linkages can be developed which, if properly nurtured can be long lasting and extremely beneficial.

Business needs to design new training programs quickly and effectively. The skills and competencies needed must be job or process specific, if they are to meet the company's production and quality goals. Business needs highly job-relevant training and they must reduce the start-up time and cost for the design and delivery of programs. As one company reported, they cannot afford to spend 30 or more days on an occupational analysis if a two-day DACUM workshop can do the same job better and much cheaper.

Who Uses DACUM?

DACUM is used by:

- **Educational agencies** such as state departments of education, community and technical colleges and institutes, proprietary school/colleges, colleges of education and universities, and secondary schools.
- **Business and Industry** to do all kinds of human resource development and quality management decision-making. Many businesses and industries (hereinafter referred to as businesses) are using DACUM for job and occupational analysis as a basis for training program development, job descriptions, career development, job restructuring, etc. Recently a number of companies have been very successfully using the method with some adaptation to analyze job processes and systems rather than for the more common identification of duties and tasks. Dinah Chesson of Ericsson reports that, "DACUM has proved to be the most efficient and effective means for gathering pertinent job-related information for use in the company's technical training and professional development programs. The internal Ericsson Wireless Communications Malcolm Baldrige Business Assessment Team recently cited the organization's use of DACUM, in training development, as a 'Best Practice'."
- **International Agencies** in over 25 countries have used the DACUM process for education and training program development and updating. User countries include: Philippines, Hungary, Jamaica, Canada, New Zealand, Venezuela, Turkey, Brazil, Malaysia, Singapore, and China.

How is DACUM Used?

DACUM has been and continues to be put to many uses. Some of the most common are presented here under three broad categories.

Management Uses:

- Re-design jobs
- Conduct performance evaluations
- Establish SOP's (Standard Operating Procedures)
- Determine task value added
- Control competency development
- Input to quality planning ISO/QS9000

Training Related Uses:

- Identify training program competencies
- Determine task importance/difficulty
- Assess training needs

- Basis for developing training materials
- Identify performance standards

Recruitment/Placement Uses

- Develop job descriptions (ADA requirements)
- Conduct career planning and development
- Certify occupation competency

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TEACHING EVALUATION - A COMPLICATED ISSUE

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Index: Teaching evaluation, factors, statistics

Abstract: To justify/quantify/qualify on teaching evaluation may be difficult and not objective as there are so much variables. Comparing teaching evaluations obtained by individual lecturer may not be meaningful, as each staff facing independent course with different students, course and other variables (or statistically, each is an independent event and a single mean value must not be compared directly with another).

INTRODUCTION

The City University of Hong Kong has a policy statement about evaluation and the Quality Assurance Committee has also published guidelines. The evaluation schemes are formulated and implemented within the Division of Building Science and Technology and College of Higher Vocational Studies. Theoretically, the schemes are the responsibility of the College. The Centre for the Enhancement of Learning & Teaching (CELT) provides services for processing the Teaching Feedback Questionnaires (TFQ) and Teaching Evaluation and Improvement Packages (TEIP). TFQ is a summative evaluation of teaching performance, whereas TEIP is for formative evaluation which aims at providing teachers with information to improve their teaching.

OBJECTIVES

To review existing teaching evaluation schemes with possible modification for achieving better quality and fairness in teaching evaluation. The term of "teaching evaluation" is hereof defined basically as the assessment of performance of an individual staff member. The Teaching Evaluation Scheme of the College (TES) issued by College of Higher Vocational Studies (CHVS 1996) states that:

a. The Scheme serves 2 primary functions:
   Formative Evaluation for the improvement of teaching; and
   Summative Evaluation for the appraisal and personnel-related assessments
b. Major Teaching Evaluation Tools in Practice are TEIP and TFQ.
c. Evaluation data are only worth collecting if it is used to promote improvement. Students are required to invest significant time evaluating teaching. Their response can only remain serious if the effects of their efforts are made apparent. This will also be true for the staff. It is required that students be given sufficient feedback and that follow-up actions are taken with the staff as a result of teaching evaluations.
d. In practical terms, the TEIP is formative with emphasis on self-evaluation and self-improvement, whereas the TFQ is mostly used for summative purposes. The basic rationale/emphasis on improving teaching seems to have been ignored in the TFQ exercise. Therefore, consideration should be given to the possibility of merging the aforementioned two instruments for the following reasons:
   i) Part A of TFQ is actually formative;

ii) Students, especially first year students are often unable to appreciate the differences between the TEIP and the TFQ;

iii) Frequent filling in of questionnaire fatigues students thus results in that students take the process less seriously.

The suggested new questionnaire (SNQ) should incorporate the essences of the current two forms and more descriptive information should be provided, *e.g.*, marks 1 to 7 may denote VERY POOR, POOR, UNSATISFACTORY, SATISFACTORY, GOOD, VERY GOOD and EXCELLENT respectively. The SNQ therefore will be not only formative and developmental, but also summative and judgmental.

A staff member may conduct the SNQ twice in a course, one at an intermediate occasion and the other at the end. Only the second result will be kept in the record. And the staff member may discuss the result of the first one with the students.

POSSIBLE PROBLEMS AFFECTING TFQ RESULTS

A. Statistics Related Matters

For a large sample size (*i.e.* number of response $n \geq 50$), it probably is reasonable to assume that the random variable of error follows the standard normal distribution (Chen *et al.* 1980, Freedman *et al.* 1998).

Assumptions: For small sample sizes, we have to assume that like most practical problems, the matter of student feedback could be treated as a normal distribution, otherwise the technical problem is beyond the expertise of the taskforce. Furthermore, we have to assume that different sample sizes (student groups, often of different group size) are of identical nature, which is very much questionable statistically and practically, in order to compare between teaching staff members or between courses.

The following discussion will use three examples to illustrate the techniques that are considered suitable for tackling the problems if the aforementioned assumptions are valid.

Example 1 Staff Somebody's TFQ feedback for BST0000 is as the follows:

	Mean ($\bar{u}$)	*Standard Deviation (SD)*	*Number of Response (n)*
Overall Rating	*4.80*	*1.05*	*61*

Find the 95% confidence interval for the result.

Solution:

$\bar{u} = 4.8, \qquad SD = 1.05, \qquad n = 61.$

$$SD^{*} = SD\sqrt{\frac{n}{n-1}} = 1.05\sqrt{\frac{61}{61-1}} = 1.06$$

The expected value u for the 95% confidence level should fall in the interval of

$$\left(\bar{u} - \lambda\frac{SD^{*}}{\sqrt{n}}, \quad \bar{u} + \lambda\frac{SD^{*}}{\sqrt{n}}\right)$$

For degree of freedom N = n - 1 = 60, $\alpha = 1 - 95\% = 0.05$, from the t-distribution (Student curve) table:

$\lambda = 2.000$, therefore $(4.53 < u < 5.07)$ for a 95% level of confidence.

Example 2 Staff Someone's TFQ feedback for BST9999 is as the follows:

	Mean ($\bar{u}$)	*Standard Deviation (SD)*	*Number of Response (n)*
Overall Rating	*6.29*	*0.49*	*7*

Find the 95% confidence interval for the result.

Solution:

$\bar{u} = 6.29$, $SD = 0.49$, $n = 7$.

$$SD^+ = SD\sqrt{\frac{n}{n-1}} = 0.49\sqrt{\frac{7}{7-1}} = 0.53$$

The expected value u for the 95% confidence level should fall in the interval of

$$\left(\bar{u} - \lambda\frac{SD^+}{\sqrt{n}},\ \bar{u} + \lambda\frac{SD^+}{\sqrt{n}}\right)$$

For degree of freedom N = n -1 = 6, $\alpha = 1 - 95\% = 0.05$, from the t-distribution (Student curve) table:

$\lambda = 2.447$, therefore $(5.80 < u < 6.78)$ for a 95% level of confidence.

Example 3 Compare the aforementioned two feedback results with different sample sizes.

Solution:

Step 1:

$$T = \frac{\left|\bar{u}_1 - \bar{u}_2\right|}{\sqrt{SD_1^2 + SD_2^2}}\sqrt{\frac{n_1 n_2 (n_1 + n_2 - 2)}{n_1 + n_2}}$$

where $\bar{u}_1 = 4.80$, $SD_1 = 1.05$, $\bar{u}_2 = 6.29$, $SD_2 = 0.49$ and $T = 26.178$

Step 2: $N = n_1 + n_2 - 2 = 66$, $\alpha = 0.05$ (for 95% confidence level)

From t-distribution: $\lambda = 1.990$

Step 3: If $T > \lambda$, then $u_1 \neq u_2$

i.e. u_2 represents a better result than u_1 does.

(If $T < \lambda$, then $u_1 = u_2$).

Based on the above discussion, we concluded that:

a. From the viewpoint of statistics, the TFQ result is an interval, not a digital figure (Example 1 & 2). Different results have different intervals;

b. Based on Point a, values related to arithmetic average of various TFQ mean expected values ($\bar{u}$), *e.g.* the divisional mean is less significant statistically;

c. To simply compare any two TFQ mean expected values ($\bar{u}$) has little meaning statistically. A proper method for comparison is illustrated via Example 3.

Recommendations:

1. The TFQ result should be presented in the straightforward 'interval' format rather than in the 'sample mean + standard deviation' format;
2. A reference point for Divisional standard somewhere below the Divisional median value could be set. A resultant interval around or beyond the set point should be deemed as acceptable.

B. The impact of oral medium of instruction on evaluation results:

The City University of Hong Kong is committed to excellent teaching, which includes using English as teaching medium. Fluency in English will no doubt add weight for students in the keen job market. As known to all, Hong Kong students feel easier and more comfortable in listening to their home dialect Cantonese in class (Actually this argument has been used for the government to promote teaching with mother tongue in primary and secondary schools). In the situation of Cantonese popularizing in class, those teachers who use English as teaching medium will naturally be in a disadvantaged position.

To encourage more use of English in class, we suggest adding one more item in TFQ: Does the teacher use English in class?

_____ 100%, ______75%,_______50%, ________25%, ________None.

100%, multiply 1.2; 75%, 1.1; 50%, 1; 25%, 0.9; none, 0.8. These coefficients will be applied to the overall evaluation (Part B) as encouragement for sticking to the University's official policy on language of instruction.

C. Reliability of Quantified Teaching Evaluation

Up to date, teaching cannot be fully quantified. Staff members feel threatened by the use of students' evaluation as the major measurement instrument to judge their capacity, performance and contribution as a teacher, yet students see little improvement as a result of evaluation. Quantification of teaching needs more detailed research, as teaching mode, role of the particular teaching staff (for example, Course Examiner), class size etc. These variations should be reflected in the calculation of teaching workload. TFQ is vital in stimulating teaching but sometimes produce pressure for teaching staff. For example, strictness to students and persistency in standards may offend students and result in low TFQ. Therefore, TFQ could only be one of the factors in evaluating a teaching staff. The other performance in teaching may also be quantified besides TFQ.

D. Factors affecting feedback of a lecturer's true performance in teaching:

***Nature of course*:** Most learners/students tend to dislike tough (theoretical, abstract, and/or complex) subjects/courses, especially those not closely related to their own discipline/core profession according to their perception. Their inability to learn/absorb effectively from the lecturer would be the ultimate fault of the lecturer, but not themselves (Cashin 1990, Cranton and Smith 1986, Feldman 1978). They may have not paid the effort in devoting to learn hard; instead they put the blame on the lecturer. This may be more severe for new students when they first join the University from post secondary schools, facing a new transition of education system e.g. credit unit system; and just acclimatized themselves into higher vocational training or para-professional courses where they have not studied previously. Most Level one courses are fundamental courses and integrated with Out of Discipline, Chinese Civilization, Language courses which in turn may make their curriculum tougher, posting a negative effect towards teaching evaluation e.g. TFQ. The situation may turn better when they are more accustomed to this mode of study environment in higher/final years.

Maturity of students: It has been argued that majority of the students are not qualified to give feedback on (or to evaluate) lecturers' teaching, as they do not possess necessary knowledge to judge objectively. However, they could, to some extent, feedback on the way a lecturer delivers his lecture/tutorial/studio, etc., but not on the academic standing yet. A serious lecturer may pose a very serious attitude towards lecturing while not smiling nor being humorous. There has been research stating that students tend to like the course when they like the lecturer/style of lecturing, thus may learn better. Each evaluation instrument should be designed for a specific audience and should only include items for which that audience is capable of giving informed responses. Evaluation should be explained to all students. For the elicitation of reliable and accurate results, students should be properly briefed on the purpose of the evaluation before undertaking the questionnaire completion. The overall average score of the TFQ for academic staff is released to students as a reference (CHVS). According to Knapper (1997), it is believed that students who obtain good grades from their teachers are likely to mark their teachers higher and vice versa. Students may not have certain limitation in making fair judgement. There was a perception by some staff members that results on the TFQ largely reflected students' liking of a lecturer, which in turn was fostered by "mollycoddling" students.

Way of teaching: An active lecturer who employs lively teaching methods together with his friendly, humorous, open-minded, helping character (not sacrifice on academic matters to students) may score more positive feedback from students. Alternatively, a tough/blunt lecturer who is not easy-going or being difficult to approach by his students may score more negative feedback. Students tend to find the easiest way to pass or obtain high marks in a course, without spending too much time/effort. A lecturer will have to (or bound to) make their learning more convenient and effective, in order to obtain positive feedback/better TFQ results. Too much or too less notes could be blamed by students. Involvement of too advanced technology in teaching *e.g.* certain computer software where students are difficult to follow, may receive negative feedback. Joint/shared teaching for a particular course may also affect students' marking (being the evaluator in TFQ) for each and every of the lecturers, where one lecturer may teach the tough part of the syllabus while the other(s) may teach the easy part. A responsible lecturer may not be a popular lecturer. To what extent shall we serve/suit/satisfy the students? Shall we treat them only as customers ultimately?

New Course/Old Course: A lecturer who has taught the same course for several times may be more beneficial to a lecturer who teaches new course, as he understands more the syllabus, developed more useful materials and grasped the needs or taste of students. Then he may obtain positive feedback/evaluation from students versus another lecturer who may not possess all these advantages. The latter may end up with negative feedback/ evaluation, especially when facing a transition period of new syllabus under credit unit system, new types of students, *etc*. But a teacher's evaluation for a particular course should not be a one-time practice. It may continue over a period to see the progress if it is allowed practically. Another matter is whether the courses wherein TFQ is conducted should be the choices of the staff member or the management. This will be affected largely by the factors such as teaching of core or non-core, fundamental or practical courses, class size, teaching load, and *etc*.

Bargain: It may be a fallacy that bargains exist between lecturers and students. Students may not truly reflect a lecturer's teaching where they fear that their feedback/evaluation may affect the lecturer's grading, in turn affect their examination grading, or vice versa. There are established mechanism for academic matters/grading e.g. moderation of examination papers/coursework/design projects where a bargain may not be that easy, unless a lecturer is not professional/genuine. A lecturer who fails many students in a course may still obtain positive feedback/evaluation. Alternatively, will a lecturer who give high marks to many students surely not receive negative feedback or evaluation? There may not be absolute evidence/verdict to prove a bargain exist or not exist.

OVERALL COMMENT

With the forgoing discussion, to justify/quantify/qualify on teaching evaluation may be difficult and not objective with so many variables. Comparing teaching evaluations obtained by individual lecturer may not be meaningful, as each staff is facing independent course with different students, course and other variables (or statistically, each is an independent event).

Those entrusted with using the information from teaching evaluations for decision making related to career progression should be skilled in interpreting and drawing together the difference sources of information.

It has been commented that students receive little feedback from the information which they provide. Students see little improvement as a result of evaluation. Students are overloaded with questionnaires and do not take them seriously. Staff members feel threatened by the use of student evaluation only to judge their capability as teachers. All these factors may have further weakened the degree of trustworthiness of teaching evaluation.

RECOMMENDATIONS

a. TEIP and TFQ should be merged and a new questionnaire developed in the way that it is formative, summative, developmental and judgmental;

b. Resultant data should be presented in the way of an interval format rather than in the 'sample mean + standard deviation' format;

c. A reference point for Divisional standard (perhaps, somewhere below the Divisional median value) could be established. A resultant interval around or beyond the set point should be deemed as acceptable.

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BEST COPY AVAILABLE

PROGRAM QUALITY AND FLEXIBLE MODE DELIVERY: BACHELOR OF HEALTH SCIENCES (*ABORIGINAL HEALTH AND COMMUNITY DEVELOPMENT*): A CASE STUDY

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Abstract: This paper reflects on the issues that have a continuing influence on the development of an academic program that is responsive to the training and academic needs of the developing profession of Indigenous health work. It describes and discusses the influences on the development of the curriculum. It also outlines how an interactive teaching and curriculum evaluation process has been developed to facilitate the monitoring of course content and quality. Part of this process includes an intensive program of block by block student evaluations. These evaluations and the student responses to the Faculty-wide First Year Experience Questionnaire are analysed. The implications for curriculum design and mode of delivery will be discussed.

Responding to the Need

For almost two decades the Faculty of Health Sciences has been a leader in the field; producing graduates trained to provide health worker services for Aboriginal communities. During this period, the training of Aboriginal health workers has evolved from short in-service sessions for health workers on the job, to the development of the present comprehensive training model. This model includes an articulated undergraduate Diploma/Bachelor of Health Sciences (Aboriginal Health and Community Development) and an articulated graduate Certificate, Diploma and Masters program in (Indigenous Community Health). These programs represent academic innovation in the flexible delivery of Aboriginal health sciences programs.

The Articulated Diploma/Bachelor of Health Science *(Aboriginal Health and community Development)*

The articulated Diploma/Bachelor of Health *Science (Aboriginal Health & Community Development)* is a professional Aboriginal Health Worker training program. These courses weave together components of the traditional the face to face semester based on campus teaching model with the characteristics of the distance education approach to higher education. The course is of four years in duration. The first two years comprise the Diploma or Years one and two of the Bachelors program. Students who elect to enroll as Diploma students will graduate with the Dip Health Science. at the completion of year two. Diploma students are offered Automatic entry into year three of the bachelors program..

The challenge

In the absence of established guidelines that a traditional academic discipline or profession might have at the ready, the challenge here has been to develop a health worker training program from the start so. The program development needs to ensure that it ,

1.Will provide the requisite technical skills required of Aboriginal Health Workers

2.Acknowledge that in most cases students enrolment in this program will also be their introduction to tertiary studies and life long learning

3.Acknowledge that students come from various backgrounds and represent diverse communities throughout the Australian continent.

4.Produce graduates who achieve a scholastic standard that is guaranteed by the University's statement of the generic attributes of graduates

5.Contain curriculum content that is both current and relevant for the variety of work situations that fall in the role of the Aboriginal health worker

6.Develop strategies that ensure all students develop a love of lifelong learning

7.Provide students with a flexible course structure through the introduction of an elective mode of learning which enables specialization in professional areas, the development of specific skills, and increases the variety of subject choice

What do Health Workers Do?

The obvious starting point is to examine what skills and abilities are basic to the evolving Indigenous health worker profession. A number of reference points need to be considered. One starting point is The National Competency Standards for Aboriginal and Torres Strait Islander health workers (1996) (NCSATSI). These standards represent one of the first systematic attempts to describe the range of skills and abilities that every health worker who operates at the community level would be expected to have developed.

These standards have now been adopted by the Vocational Education and Training (VET) sectors. They are couched around the central issue of intra-cultural diversity. For example, they state that every community will have a *"unique set of cultural values and traditions, as well as a unique location."* Hence the challenge for all Aboriginal health workers is to mould their practice so that it reflects the needs of their local communities.

The National Competency Standards for Aboriginal and Torres Strait Islander health workers identify the following roles for Aboriginal Health workers: (a)provide direct health services (b) promote wellbeing (c) improve the health of the community.(d) develop strategies to meet the health needs of ATSI communities (e) promote empowerment, (f) have skills to perform and manage a number of different tasks, (g) respond to problems and non-routine events and (h) deal with all the aspects of the workplace including working with others

The Standards are stated in relation to a broad framework that invokes a series of performance streams to describe the activities of health workers. The streams are, Clinical Care, Specific Care, Community Care, Management and Teams, Administration, and Research. The other component of the framework is the concept of varying degrees of task difficulty and requisite skill proficiency skill needed to perform each task listed by the Competencies. The degree of difficulty is described in terms of four levels. Levels A to D. Level A reflects a demonstration of basic proficiency that progressively increases to level D which is meant to reflect a demonstration of an advanced level of skill proficiency.

The limitation with relying on The National Competency Standards for Aboriginal and Torres Strait Islander health workers is that the focus is almost exclusively focused on the practical applications or, *"doing or reactive* " part of the profession. Very little is said about the cognitive skills that one would also expect to be part of the make up of a professional Indigenous health worker. An example of this is illustrated in the following extract from one of the explanatory sections of the introduction to the Competencies (page 1 Intro section 17): *The LEVEL(s) at which this Unit of competency is required by workers: Harder work is usually done by higher level workers. However, it is the GROUP (or "PACKAGE") of units which a worker does that determines the level of the work, 'easier' units may be done by a high level worker in conjunction with 'harder' units. Some units describe work done at many levels. Some units describe work only done at one level.* This extract is an example of the focus that the NCSATSI place on task difficulty.

A further limitation to using only the NCSATSI to evaluate the role of the health worker is that the more complex aspects of Indigenous health work go unrecognised. More importantly the skills are couched in prescriptive language, thus leaving little room for the natural creatively in behaviour that one would expect in a true professional..

What are the attributes of Graduates of the University of Sydney?

A perhaps more comprehensive approach is to expand the concept of competencies to include cognitive and academic skills as well as basic vocational skills. To a large extent this happens at the University of Sydney. The University sets the basic attributes that should characterise all of its graduates. Furthermore it also requires specific application of the generic attributes of graduates to be related in specific terms to each course.

The following table describes the generic attributes of graduates of the Bachelor of Health Science *(Aboriginal Health and Community Development)* graduates. When reading this table one should note that students of this course are training for employment in various settings in Aboriginal health and community development. They are expected to cope with and facilitate change at the individual and the community levels; and will be developing individually, socially and spiritually. Graduates will display the following skills:

Table I. The generic attributes of the graduates of the Bachelor of Health Science

Knowledge skills

Have a body of knowledge in Aboriginal health and community development.

Thinking skills

Be able to exercise some critical judgement, be capable of rigorous thinking, able to account for their decisions, be realistic self-evaluators, adopt a problem solving approach and be creative and imaginative thinkers.

Personal skills

The capacity and desire to continue to learn; The ability to plan and achieve goals in both the personal and the professional sphere, and ability to work with others.

Personal attributes

Strive for tolerance and integrity, acknowledge their personal responsibility for their own value judgements and ethical behaviour towards others

Practical skills

collect, correlate, display, analyse and report observations and apply results of research and systematic observation to new situations; and generate and test questions related to Aboriginal health and community development

Professional skills

Identify factors which impede or promote health in Aboriginal individuals and communities. Communicate effectively with Aboriginal and other people, organisations and communities

The Market

Knowing how the consumers of an academic program feel about their studies is important. At this point it is appropriate to consider what students who are presently enrolled in the course have to say about their reasons for their decision to come to study at university. The data that will be discussed here was obtained from the First Year Experience Questionnaire. Each year the faculty conducts a survey of all first year students using a modified version of the McInnis, C. and James, R. (1995). *First Year Experience Questionnaire,* students are asked to complete the questionnaire in the second week of the second semester of study. Hence, by this stage most students have had the experience of one semester of university study and have developed a reasonable commitment to the course they have enrolled in. Appendix I extracts the results for some sections of this questionnaire that was administered in 1998.

Students (AHCD) were asked to indicate what were the important influences on their decision to study at university. The two most important influences reported by 96% of respondents were, being able to develop talents and creative abilities, and being able to study in a field that held high personal appeal. The need to train for a specific job was identified as being most important by 89% of respondents. The next cluster of responses involved issues such a being with people of a similar culture 68%, and getting a job with a good salary 71%. It is interesting to note that being with friends only attracted positive responses from 28% of respondents and expectations of family had even fewer positive responses at 7 %.

Curriculum Evaluation and Course Development

Melrose (1998) defines curriculum evaluation as "the process by which a judgement is made about the worth or merit of a curriculum or its appropriateness for the individual, the group, the organisation offering it or the society within which it operates." (p37). As this definition suggests the process will be multifaceted. It will focus on issues of immediate interest as well as pin-pointing issues that will have a longer term significance on the quality of the programs on offer. The objectives are to evaluate: (a) the degree of student satisfaction with the study block they are currently attending, (b) determine the level of satisfaction with individual classes that they have attended, (c) test the perception of progress based on the stage of the course students are currently enrolled in, (d) the extent to which expectations have been achieved and (e) the extent of student participation in related aspects of their studies.

Institutional integration

The questionnaire is administered three times a semester (each of the blocks students attend) and is kept in a similar format throughout the year. The questionnaire consists of three components. The first part (Part A) relates to the subjects that are currently on offer. This section asks students to respond to questions that relate to the perception of the effectiveness of the teaching/learning environment. The second component asks students to relate their performance and study to the social and personal environment. Issues such as social and cultural needs are canvassed at this stage. The third part asks students to both identify and comment on what they like most and least about their current academic experiences, as well as inviting the respondents to also suggest improvement. An important part of the process is that issues that were raised and discussed in previous blocks are represented for comment and affirmation. Hence rather than letting issues "go away", issues are brought back in order to check on the extent to which resolution has been achieved.

A note on the selection of questions is that some issues remain relevant throughout the semester, whereas others occur in a temporal context. To reflect this situation some questions remain unchanged throughout the semester, others remain the same in essence but change in tense. For example in the first administration the following question; "*I look forward to further study of this subject...*" would be restated in the next questionnaire as, '*I have continued to enjoy studying this subject...*".

Students complete the questionnaire on the last day of each block. The results are presented to them on the first day back of the next block and the issues generated are discussed at a staff student forum midway through the block. Immediately after students leave a staff teaching /learning meeting is called to discuss and action the results.

Learning Styles

The need to respond appropriately to issues related to student performance, flexible teaching and varying learning styles has been shown to be important to the process of effective curriculum development. Milem, J. F. and Berger, J. B. (1997) Students enrolled in the Diploma/Bachelor of Health Sciences were asked to indicate the frequency of various academic activities. One cluster of questions was focused on learning activities such as attending lectures and note taking. Over 80% of students responded that lectures were a valuable source of learning and stimulated their interest. It is interesting to observe that only 4% indicated that they often borrow lecture notes from friends. On the other hand 50% said that they never do. For the statement "Most subjects are really interesting" 89% agreed. Group work is favoured by the majority of respondents. A total of 64% of respondents say they -discuss subjects with other students and reported that they were encouraged by staff to work in groups. Over 70% believe that class discussions are worthwhile even though 68% of students did say that they were uncomfortable in group discussions. 89% said that they could not do well without attending classes regularly. 75% of respondents said that university has helped them to develop their learning skills. On the other hand 32% said that they had had difficulty adjusting to the university's teaching styles.

Social and institutional integration

Students did express a clear preference for working with members of their culture. Seventy five percent of students reported that they preferred to mix with students of same cultural background. Nonetheless 40% of respondents said that they kept to themselves. However only 14% said that they had not made any friends at University. One of the features of returning to the next block was to link up with old friends. An important and positive note is that 82% of students reported that they regularly seek advice of teaching staff. 50% say that staff are available to discuss my work and 75% say that most academics are approachable. 54% say they really like the atmosphere of campus. Less than 20% of students say that university hasn't lived up to their expectations.

Expectations and Academic Quality?

Nodrvall & Braxton argue that the issue of quality is complex and suggest that a definition of Academic Quality. should 'focus on fundamental course-level, academic processes and describe the quality of such processes in terms of the level of academic demands or rigor expected of students.' They define academic demands or rigour in terms of the level of understanding of course content that is demonstrated by students whilst they are engaged in the learning process. The evaluation process for the Bachelor/Diploma Health Sciences in (AHCD) programs asks students to reflect and comment on their learning experiences during the block that they are currently attending.

Students enrolled in the Diploma/Bachelor courses in Aboriginal Health and Community Development have indicated that they have a very clear idea of why they hare attending college and what they expect to achieve as a result. To a large extent this is so because a large number are already working in the profession. For example, in 82% of cases students have indicated that they know the type of occupation they want to train in. Only 11% are using their enrolment in the course to help them to decide their future. Almost 90% have indicated that they have enrolled in their course to take training to become a Health worker.

CONCLUSIONS

This paper has outlined the important issues that have presented themselves over the period that the Aboriginal Health programs have been constructed. The need has been and still is for the training of health workers who are multi skilled. To provide an effective model for program development three issues have to be addressed. They are to:

1.Identify and teach the core skills

2.Provide training that produces personnel become effect agents of change

3.Ensure that the program is in keeping with the requirements of the faculty.

Like road construction, most of the AHCD program development has occurred simultaneously with teaching. Hence the market and student expectations have been in a state of constant evaluation. The block by block student evaluation program has provided the vehicle to assist and direct program development.

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RESEARCH ON *VOCATIONAL EDUCATION AND TRAINING* AS A FIELD FOR KNOWLEDGE DEVELOPMENT – STARTING POINTS FOR THE *CEDEFOP RESEARCH ARENA*

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Index: Knowledge development; Research on vocational education and training; European cooperation; Communities of practice

Abstract: The paper provides an insight into the process of developing the CEDEFOP Research Arena (CEDRA) as a new kind of research-oriented knowledge resource environment. CEDEFOP is the European Union agency for development of vocational education and training (VET) in the EU Member States and in the associated countries. The main questions are:

1) How to interpret the *foundations of VET-related research* as cornerstones for knowledge development?
2) How to interpret the significance of *European* research and development *programmes* for knowledge development in the field of VET?
3) How to interpret the role of *'communities of practice'* within VET-related knowledge development?

INTRODUCTION

The following paper provides insights into starting points and into the creation of the CEDEFOP Research Arena (CEDRA). The general background for CEDRA is the repositioning of CEDEFOP (European Centre for the Development of Vocational Training) vis-à-vis European research on vocational education and training in the recent years. *Firstly*, the main issues of the repositioning are reflected from the perspective of CEDEFOP. *Secondly*, scientific foundations of and conceptual developments within research on vocational education and training (VET research) in Europe will be discussed. *Thirdly*, the role of European cooperation programmes (including transnational projects and research cooperation networks) in the creation of European VET research culture will be reflected. *Fourthly*, the development of research communities as 'communities of practice' and alongside communities of practitioners (as counterparts of researchers) will be reflected.

1. On the repositioning of CEDEFOP vis-à-vis European VET research

After the move from Berlin (Germany) to Thessaloniki (Greece) in 1995 CEDEFOP had to reconsider its position as a European agency for promoting development of vocational training. Part of this repositioning exercise was a process that gradually led to new CEDEFOP initiatives to promote European research cooperation and finally to creation of the strategic framework of CEDRA. In the following some critical issues for the repositioning are summarised. Then, some indications are given on the framework of CEDRA and how the framework tries to respond to the challenges.

The main challenges and for the repositioning of CEDEFOP in European research cooperation can be summarised in the following questions:

1) Should CEDEFOP position itself primarily as an *agency for research and development work* **or** as a *programme support agency* **or** as an external *agency for dissemination and capitalisation of outcomes*?
2) On what basis should CEDEFOP create cooperation between itself and research communities: as an *external funding body*, as a partner that provides *targeted support* for projects and networks, as a *hosting body* that has permanent support functions?
3) How should CEDEFOP emphasise in its research cooperation activities the following aspects: *monitoring* research capacities and progress in research, *promotion of* research communication and *community-building*, analysis and *capitalisation of research results.*

Following the initial repositioning debate CEDEFOP took several initiatives that led it gradually towards a more participative role in research work and profiled the role of CEDEFOP more as a partner than an external funding body or as a host. Finally, some of the initiatives have tried to develop strategic frameworks for monitoring activities, community-building measures and related capitalisation or experiences and results. In this context the plan to create the CEDEFOP Research Arena (CEDRA) paved the way for a new strategic approach. The pillars of the new strategic approach are the following:

a) the set of user-friendly information services that provide an access to information and knowledge resources (European Research Overview);
b) the thematic areas for research-oriented knowledge development (including the production of Research Resource Materials, construction of interactive Research Resource Bases, and promotion of Knowledge Sharing Networks);
c) promotion of knowledge development and research culture with general support activities such as the CEDRA Colloquium and related discussion materials.

The creation of the initial framework for the CEDRA and the related piloting is based on the learning experiences that have been made with the new activities that have been launched in the recent years. The most essential lessons for CEDEFOP and for the research communities are related to the following issues:

1) making a deeper analysis on the scientific foundations and conceptual developments within European VET research;
2) drawing conclusions from the role of transnational cooperation projects and networks for European VET research culture;
3) developing a new understanding for the role of network-based cooperation in the consolidation of research communities as 'communities of practice' *and* in the interaction between researchers and communities of practitioners.

2. On the scientific foundations of and conceptual developments within European VET research

The critical starting point for making a deeper analysis on the scientific foundations of VET research is the general position that VET research can only be seen as a ***multi-disciplinary space***. On the one hand the space is seen as a broad field that is shared by several approaches that are derived from different disciplines . On the other hand these approaches are going through processes of specialisation that link them to the field more that to the underlying structures of disciplines. In this respect the field of VET research could be perceived as multidisciplinary field that is characterised by a basic unity. Any attempts to analyse inner differentiation within VET research could only lead to theme-based listing of VET-specific focal areas or to academic distinctions that have no relevance for the field of VET.

This general position can be challenged by a framework that takes into account the cohesive emphasis but considers it insufficient as a basis for analysing progress in research and in research-based knowledge utilisation. The framework identifies ***four kernel domains for knowledge development*** within the interdisciplinary field of VET-related research. The basic assumption is the domains of expertise are linked to different problem contexts, conceptual backgrounds, methodologies and prospects for knowledge utilisation.

In the ***socio-economic domain*** the main focus is on the need or utilisation of qualifications and competences in working life. VET is seen as a background variable and VET systems and VET provisions are seen as users of such knowledge. The research provides support for structural planning of qualification frameworks or feedback on the interrelations between VET provisions and labour market .

In the ***socio-political domain*** the main focus is on the functioning of the VET system and on the functioning of the VET provisions as parts of the system. Some lines of inquiry give conceptual support for development of VET policies. Some approaches provide feedback information that supports policy assessment

In the ***socio-educational domain*** the focus is on the educational foundations of the VET systems and VET provisions. Research in this domain covers basic analyses of the underlying educational thinking, accompaniment of curriculum processes and analyses on new modes of vocational learning and competence accumulation.

Research in the ***socio-behavioural domain*** of VET research focuses primarily on the individual behaviour of particular target groups concerning their use (or non-use) of VET provisions and concerning their behaviour at the labour market. From the methodological point there are several lines of inquiry which focus on general transition surveys, on particular studies on target groups, on accompaniment of targeted training schemes and on development of instruments that support guidance and counselling.

It is obvious that the framework - as it has been presented above – is not the whole picture of VET research. However, the framework provides a possibility to identify the kernel domains of expertise, related methodologies and related prospects for knowledge development and knowledge utilisation.

Given the differences between the kernel domains, it is possible to have a new look on the factors that promote coherence and unity within the overarching field of VET research and promote boundary-crossing dialogue and working interfaces. On the one hand these may be related to certain ***core areas for knowledge transformation*** that are characteristic for in the field of VET . As such core areas it is possible to mention the following ones:

- uses of research as a support for curriculum development,
- uses of research in the context of training of VET professionals,
- uses of research as a conceptual support for learning in organisational contexts.

In addition to these core areas it is necessary to emphasise the role of more particular *focal areas* for knowledge development that may involve only some of the domains but stimulate new alliances between VET-related research and development expertise and complementary fields of expertise. As such focal areas it is possible to mention the following:

- research on uses of information and communication technologies (ICT) in the field of VET,

- research on patterns for integrating work-related learning in VET provisions and new partnerships between educational establishments and work organisations,
- research on regional VET-related initiatives and on their links to broader regional initiatives.

3. On the role of European programmes for the development of research culture

It is essential to note that the field of VET research is to a major extent overshadowed by the national characteristics of VET systems. Therefore, national concepts and underlying assumptions provide conceptual barriers to cross-cultural communication and for knowledge development at European level. From this perspective it is necessary to have a closer look what kind of role of transnational research cooperation may have in knowledge development in the field of VET.

Roughly, the impact of European cooperation programmes on European research culture can be indicated in the following points:

1) development of a new kinds of transnational projects that do not limit themselves to pre-comparative reporting on national developments *but* proceed to problem-oriented comparisons and to treatment of critical issues with patterns of collaborative research;
2) development of new kinds of networks that do not limit themselves to mere exchange of information and joint tenders *but* develop themselves as working and learning communities;
3) development of new kinds of joint communication facilities for supporting knowledge sharing among research communities and for promoting further analysis and utilisation of research in an organised dialogue between researchers and users of knowledge.

In this context it is necessary to note that transnational projects have raised new needs for 'accompanying research' or 'research-oriented monitoring' or 'research-based capitalisation of the outcomes' at the European level. At the same time transnational cooperation has opened new possibilities for knowledge transfer between different national patterns.

In general terms the notion '*accompanying research*' refers to a programme context in which reform activities, experimental programmes or innovatory initiatives are supported by a related research project. The notion 'accompanying research' refers often to single projects and individual case studies. Consequently, the notion *'research-based accompaniment'* is a more generalised expression which characterises the role of accompanying research projects in the programme or accompanying measures that cover a broader range of innovatory activities. In many countries there is no systematic pattern of to link such research-based support to pilot projects. However, most European countries have experience on similar uses of research in VET-related development concepts, but in slightly different roles (such as 'evaluation research', 'implementation research', 'process consultancy' 'action research').

The current interest on such research approaches is related to efforts to create a more systematic understanding of research as an infrastructural and interactive element in supporting the development of VET systems and VET provisions. This interest is closely related to the interest to consolidate VET research as a 'practice' *and* as 'research' that has a particular intermediate function between theory and practice.

4. On the role of scientific communities and of 'communities of practice'

The issues that have been discussed above tend to fall beyond the scope of traditional research disciplines. At the same time there are very few examples of countries that would have provided VET research the basis to develop particular research disciplines. Instead, the typical problem in most European countries is that of VET research suffers from an institutional marginalisation. To some extent this marginalisation has been overcome by the community-building initiatives of transnational research cooperation networks.

As a part of its efforts to promote European research cooperation CEDEFOP has tried to develop an appropriate approach to support the community-building measures that are based on 'independent' networks. Moreover, CEDEFOP has tried to find out whether there is a possibility to develop synergy between major networks that have complementary tasks.

However, because of their voluntary and temporary character networks have only a limited potential to promote the consolidation of research communities within European VET research. Instead of being infrastructural actors they should be considered as particular platforms that contribute to community-building processes.

Therefore, CEDEFOP has shifted the emphasis from 'networking the networks' to 'networking of knowledge resources' and to support for knowledge development that draws upon the work of European cooperation projects and networks. Moreover, CEDEFOP has to take into consideration the limits of research communities as actors in knowledge development *and* potential conflicts of interest between research communities and communities of practitioners. In this respect CEDEFOP has to emphasise the needs of balanced *research dialogue* between knowledge production and knowledge utilisation. The theoretical insights into the scientific foundations of VET research and into the development of research culture provide a basis for positioning CEDEFOP as a promoter of European research dialogue.

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KNOWLEDGE DEVELOPMENT AT THE INTERFACE OF RESEARCH, POLICY AND PRACTICE – SUPPORT FOR KNOWLEDGE DEVELOPMENT WITHIN THE CEDEFOP RESEARCH ARENA (CEDRA)

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Index: Computer-mediated collaboration; technology; knowledge development.

Abstract: This paper outlines the underpinning theory and technology supporting processes of knowledge development within the CEDEFOP Research Arena (CEDRA). The support for dispersed communities of practice has been developed using web-based collaboration and knowledge sharing tools. These provide a comprehensive telematic platform for interactive and focused knowledge sharing and transformation for practitioners, policy makers, and researchers interested in vocational education and training in Europe. Note some details of how these tools work in practice, in the context of careers guidance, is given in the linked paper of Brown and Attwell (2000).

INTRODUCTION

Previously Brown & Attwell (1999) produced an overview of how computer-mediated collaboration and knowledge transformation processes can support a community of practice of Vocational Education and Training Researchers in Europe. The first task here is to focus upon how the theoretical framework developed to explain processes of organisational knowledge creation (Nonaka & Takeuchi, 1995; Nonaka & Konno, 1998) was adapted to provide a theoretical underpinning for the design of the CEDEFOP Research Arena (CEDRA). For the CEDRA telematic platform we are using a social model of knowledge creation, and the key process for genuine knowledge transformation to occur is that knowledge has to move from the individual level into wider communities of interaction that cross organisational boundaries. Nonaka & Konno (1998) use the idea of *ba* as shared spaces for emerging relationships that provide a platform for advancing individual and/or collective knowledge and of generating collaborative processes that enable the transformation of that knowledge to other contexts. In this framework if knowledge is separated from *ba* – space for interaction and relationships – it becomes merely information.

Information can reside in networks through associated papers, but knowledge resides in the relationships of the *ba*, because it allows possibilities for collaboration to transcend particular perspectives. In the field of vocational education and training, for example, information on the use of key qualifications in practice remains underused in practice precisely because it remains as information – few opportunities are given for practitioners to transform this into practical individual and collective knowledge. Within a telematic environment it is possible to get contributions from a range of perspectives. It has great potential, although in many computer-mediated communication (CMC) environments that potential is not always realised. This may be because the analytically rational world of 'pure' CMC environments may be too 'cold' for many people: they need a richer form of engagement. Nonaka & Takeuchi's (1995) SECI model (of socialisation, externalisation, combination and internalisation) as a spiral of dynamic knowledge conversions gives insight into why this lack of engagement may occur (see figure 1).

Figure 1: Adaptation of Nonaka & Konno's (1998) four Characterisation of Ba

Socialisation Originating Ba (Space for socialisation: face to face interactions)	Externalisation Interacting Ba (Space for active reflection)
Internalisation Exercising Ba (Space for conversion of explicit knowledge to tacit knowledge of individuals and groups)	Combination Cyber Ba (Space for combining new forms of knowledge with existing information)

Note: Continuous spirals occur through SECI process.

Nonaka & Konno (1998) point to the need for an originating *ba* (or space for socialisation) where individuals can share feelings, emotions, experiences and mental models. This is necessary not only to generate initial commitment (the value of which has long been recognised), but also because genuine knowledge transformation also requires a "magic synthesis" of rationality and intuition that requires a greater depth of human engagement than just thinking. Their model is implemented within CEDRA in the following way:

Socialisation (through originating *ba*):

A number of meetings have been held in different parts of Europe in order to allow some of those involved in a dispersed community of practice to understand the principles behind the development of CEDRA and to discuss some of the substantive issues highlighted in the different Research Resource Bases.

Externalisation (through interacting *ba*):

This will involve the set up of thematic groups, comprising individuals with a mix of backgrounds, knowledge and capabilities. Individuals will then be able to share their own models, ideas and understandings, and through processes of reflection and analysis, seek to generate some common understandings of the group's particular themes. Through focused interaction tacit knowledge could be made explicit and some new understandings of 'knowledge' created, upon themes such as learning organisations, continuing professional development in VET, and key qualifications.

Combination (through cyber *ba*)

Each group's ideas (and explicit knowledge) are then presented in the telematic environment, where their ideas are combined with existing information and knowledge drawn from the rich evidence environment in a process of knowledge transformation. Other members of the learning community will be encouraged to contribute to and engage with this process.

Internalisation (through exercising *ba*)

The exercising *ba* is a shared space in the telematic environment to facilitate the conversion of the (newly generated) explicit knowledge into the tacit knowledge of individuals and groups. This will involve active consideration of how to apply that knowledge in different contexts and the use of strategies to support the knowledge conversion process. An example of this would be through consideration of how particular cases could be adapted in order to be applied in other settings.

CEDRA will facilitate the spiralling of knowledge creation and transformation through continuing SECI cycles on different themes. The dynamic structure of the telematic environment will also allow material and ideas to be rapidly transferred between themes. The essence of the *ba* of the learning community as a whole is that it will not involve a static accumulation of different materials, documents and information, but rather it will possess the dynamism to continually create new knowledge. Within this vision the role of the telematic platform of CEDRA is to provide a rich virtual knowledge environment to support the processes of collaboration and knowledge creation and transformation in European VET research and development.

SUPPORTING KNOWLEDGE DEVELOPMENT THROUGH CEDRA

CEDRA does not focus simply upon computer mediated communication. It seeks to enhance and facilitate processes of knowledge development within the wider community of practice. CEDRA will continue with meetings and seminars, and will support dissemination through more traditional print media as well as developing CMC and ICT based systems and processes. CEDRA emphasises too the importance of developing spaces for the exchange of information, and establishes links or gateways to other sources of information, including material from a variety of organisations with an interest in policy, practice, training or research in vocational education and training.

The material to be presented in CEDRA telematic platform is being converted into structured XML resources using a specially designed editor. The aims of this conversion are to allow additional layers of meaning to be added to documents and other materials, in order to enable discussion and knowledge transformation processes based on the materials to occur at a fine grained level and to make meanings more explicit. We do not intend that 'documents' should apply simply to written papers. Given that one of the key aims of CEDRA is to develop knowledge through sharing of ideas and meanings, we believe that there is the need to exchange and co-operatively create a wide range of materials. The materials we are using include edited transcripts of practitioner testimony, group discussions on key issues, and case studies of problems found in practice. Where we are working with research or policy 'papers' or 'documents' we seek to break these down into smaller components (or 'chunks') that contain key ideas or meanings. A component may, for example, express a hypothesis, advance a concept, contradict other findings, illustrate a key point or advance new thinking.

The editor also allows authors to construct and develop new relations between ideas contained in text, or to external papers and work. The richer format of description is added through a document type definition – or 'schema' - that can be defined for each 'kind' of resource. Different schemas might include a case study, an evaluation report, a portfolio or a comparison. The editor uses eXtended Markup Language (XML) code. This is a flexible language, designed to allow open standards to be defined by communities of practice themselves, and to allow interchange through the World Wide Web. Unlike the standard Hypertext Mark-up Language (HTML) used by most Web sites, XML allows software to 'know about' the content of a document as well as its appearance and layout. The XML representation of the resources can be rendered in different ways

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to allow different ways of 'viewing' content and interacting with it. The first render being developed provides a Web interface. Whilst documents may be viewed in a traditional way, different navigation options allow the user to access smaller components and to reorganise views of parts or the whole resource base. This will be of particular value as the resources grow. Key-word searches and scrolling of documents at the moment allow only limited access to ideas, compared to the much wider range of ways of searching and representing material afforded by our navigational tools.

Another key feature is the ability to access other texts thorough embedded icons and roll over items. This may for instance provide information on the background to a reference, or details of a glossary item or details of a linked idea or access to a footnote. Most powerful is the ability to access and add annotation to the text, and to annotate the annotation. Instead of having a separate list server or email client for discussions about an idea or case study the discourse can be embedded in the document itself. Going one step further, it may be that the discourse emerges around the annotation and that then becomes a major document in its own right. A record of the discourse is readily available as part of the site itself. There is no need for participants to join a formal group or painstakingly try to keep up to date with lengthy communications.

In its focus on discourse though shared annotation as a major means of communication, CEDRA is building on older academic practices of knowledge development. Documents cease to be statically presented but take on a 'social life' through a process of interpretation and disputation. The process of knowledge transformation may be particularly potent in an interdisciplinary field such as careers guidance. Knowledge may be transformed through a process of re-contextualisation to different settings and boundary crossing between different academic traditions. The fine-grained semantics that the editing tools seek to supply should facilitate these processes. A focus on practice is a central theme of CEDRA, in order to encourage the development of knowledge, that makes use of the processes of '*knowing*' that Brown and Duguid (1996) see as crucial in the development of new knowledge. The key problem unmasked by the attempt at extensive computer-mediated collaboration by teacher training institutions across Europe in the REM project (Owen and Liber, 1998) is how to facilitate discourse and interaction. Unfortunately, most university or project web sites centre on disseminating the outcomes of research rather than on facilitating debate about practice.

How can this focus on practice be developed? CEDRA will attempt to link with students, trainers, practitioners and policy makers as well as researchers. Encouragement will be given to making links to practice, especially through links with research and development projects. Acts of reflection performed during development can be more important than the products of the work for developing knowledge from practice. The provision of a good user interface is critical. At least in its early developmental or experimental phase, CEDRA will draw upon face to face discussions and events to tie into a series of 'events' using virtual technologies. These could take the form of on-line seminars or debates. The key criteria are that they are well prepared, time bound and moderated. Whilst the use of the tools outlined here might mark a first step, further investigation is needed into the design of interfaces for Continuing Professional Development for dispersed communities of practice. At the same time as developing CEDRA as a focus for knowledge sharing and development, it is important to study its use and to continue explorations and research into the broader processes of knowledge development in communities of practice. The evaluation of the use of collaborative technologies in supporting communities of practice is vital if lessons learned on this project are to generalised. There has been considerable interest in the role of technology in the support of collaborative and communicative work and learning. These have been seen, for instance, in the context of work flows (Winograd & Flores, 1987), as collaborators around living documents (Brown & Duguid, 1996) or as socio-cultural activity systems (Engeström & Cole, 1993). These ideas have been applied to education (for example, Guile & Hayton, 1999), where they have generated both strong opposition (Robbins & Webster, 1999) and major supporters for the use of collaborating technologies as learning tools (Mason, 1998). In general, however, practice has not always lived up to the potential (Hilz, 1985), so critical scrutiny formatively and summatively is vital in considering the degree of success of the innovative use of telematic tools proposed in this project.

Perkins and Newman (1996) point out that while there are often virtuosos in such milieux, there are also those who are only there by virtue of registration and not by their engagement. The issue of what is and what is not effective for some in these on-line collaborative situations needs to be addressed if we are to develop some generalisation of the processes of the use of technology in the support of communities of practice. We will therefore evaluate the processes of collaboration and learning supported by the technology. We will study the community of practice in its socio-cultural setting to uncover some of the reasons, issues and problems that make the use of these technologies successful or unsuccessful. This is intended to be a formative and iterative approach as the management of the system will change in reaction to the evaluation. We will adapt methodologies of systems design that are firmly based on socio-cultural activity theory (Engestrom and Cole, 1993). Kapetelinen and Nardi (1997) have produced guidance that will be incorporated into the evaluation approach.

Kaptelinen and Nardi's checklist, for the application of activity theory to human computer systems design, is a conceptual tool for identifying the most important factors influencing the use of computer technologies in a particular setting. The process from their perspective follows a clear sequence. The first phase involves starting from observational data to indicate potential problems, then formulating requests for further analysis, and providing some suggestions on how the "problem" can be solved. In the second phase an Activity Checklist, that can be used iteratively, is introduced. The general structure of the Checklist corresponds to the four main perspectives on the use of the technology to be evaluated:

- focus on the structure of the user's activities - that is the extent to which the technology facilitates and constrains attaining the user's goals and the impact of the technology on provoking or resolving conflicts between different goals;
- focus on the structure of environment - that is the integration of technology to support a community of practice with requirements, tools, resources, and social norms of the environment;
- focus on the structure and dynamics of interaction - that is internal vs. external components of activity and support of their mutual transformations with the use of systems to support and build communities of practice;
- focus on development - that is the developmental transformation of all the above components as a whole.

CONCLUSION

The knowledge transformation activities of CEDRA will involve a mix of real and virtual encounters, leading to a spiral of knowledge creation and transformation on different themes. The dynamic structure of the telematic environment will also allow material and ideas to be rapidly transferred between themes. The essence of CEDRA is that it will not involve a static accumulation of different materials, but rather it will possess the dynamism to continually create new knowledge. Within this vision the role of the telematic platform is to provide a rich virtual knowledge environment to support the processes of collaboration and knowledge creation and transformation to support research and development of vocational education and training in Europe.

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USE OF WEB-BASED COLLABORATION AND KNOWLEDGE TRANSFORMATION TOOLS TO SUPPORT THE DEVELOPMENT OF A LEARNING COMMUNITY TO ENHANCE CAREERS GUIDANCE PRACTICE

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Index: Careers guidance; information technology; knowledge transformation.

Abstract: This paper outlines progress towards the development of a learning community to enhance careers guidance practice, through the process of developing web-based collaboration and knowledge sharing tools. These will be used in order to provide a comprehensive telematic platform for interactive and focused knowledge sharing and transformation for Careers Guidance students, tutors, practitioners, policy makers, and training organisations as collaborative participants in a dynamic community of practice. Note some of the technical detail of the operation of the system is given in the linked paper of Attwell and Brown (2000) describing knowledge development in the CEDEFOP Research Arena.

INTRODUCTION

One aim of a major European-funded ADAPT project is to seek to support the development of a learning community to enhance careers guidance practice as a key service to education and training in the United Kingdom. The focus upon enhancing careers guidance practice is particularly apposite at this time because the massive and continuing changes in policy and practice in this area have left policy-makers, practitioners, trainers, students and researchers without a coherent view of how careers guidance will develop in the medium term. This presents an excellent opportunity to engage all players in a search for new understandings of the contextualisation, enrichment and renewal of Careers Guidance as a key service to education and training. A second reason for focusing upon the development of a learning community based upon careers guidance practice is because the training of careers guidance practitioners is also being extensively reshaped. This has profound implications for initial training and continuing professional development (CPD) programmes. The processes of teaching, learning, knowledge development and utilisation will all need to be reshaped. The project is working with training providers in England, Scotland and Wales to develop an imaginative way of linking processes of knowledge acquisition, development, transformation and creation with approaches to tackling the core problems of Careers Guidance practice.

The different groups mentioned above sometimes interact at conferences, seminars or carers guidance 'fairs'. However, the Careers Research Network established under the ADAPT project is the first attempt to bring together all parties with an interest in research and development of careers guidance practice. This bringing together of representatives of a dispersed community of practice has proved very worthwhile, but something in addition to face to face meetings is required to turn this into a more inclusive learning community. The ADAPT project is in the process of developing prototype web-based collaboration and knowledge sharing tools to support the network. The intention is to provide a comprehensive telematic platform (or Guidance Arena) for interactive and focused knowledge sharing and transformation for Careers Guidance students, tutors, practitioners, policy makers, and training organisations as collaborative participants in a dynamic community of practice.

THEORETICAL FRAMEWORK

The project is dependent upon the integration of ideas from three strands of previous research. First, when seeking to develop a learning community to enhance careers guidance practice we believe the relevant unit of analysis is careers guidance practice within particular social, cultural, historic and political contexts. This fits with Engeström and Cole's (1993) notions of cultural historic activity theory. Second, our view of how knowledge creation and transformation processes, grounded in practice, can be facilitated is developed from the work of Nonaka and Takeuchi (1995) and Nonaka & Konno (1998). Third, the investigation of the pedagogical aspects of the innovative use of telematic tools to support a professional community of practice will draw upon Kaptelinen and Nardi's (1997) activity methodology as the basis for the enquiry.

The design of technological support for the development of communities of practice calls for the use of highly innovative design methodologies that take into account the social, cultural, historic and political context that any change is to be located (Engeström and Cole, 1993 : see figure 1).

mediation
subject object
rules community division of labour

Figure 1: activity system

note i: each factor is influenced by each adjacent factor irrespective of level

note ii: the whole system is dynamic and changes over time

Applying Engeström and Cole's (1993) activity theory framework to our study of careers guidance practice would give the following:

- Subject: careers guidance practitioners (goal-directed actions; beliefs; ideas; mental models);
- Object: careers guidance practice (patterns of behaviour; relations with clients);
- Mediation: socio-cultural ideas about guidance practice (tools; theories; approaches; historical traces and cultural meanings associated with careers, occupations and identities);
- Rules: changing frameworks for regulation of practice (focus of guidance practice; statutory entitlements; service targets);
- Community: extent to which value systems are shared (ideas about 'good practice', meeting targets, nature of professionalism);

- Division of labour: between practitioners, specialists and assistants (roles and relationships).

The 'value added' of applying cultural historic activity theory to the enhancement of careers guidance practice is that it gives a much richer framework for searching for new understandings of the attempts at the contextualisation, enrichment and renewal of careers guidance. It can be used to highlight the value of analysis of the consequent effects elsewhere in the system of changes in one part of the system. In particular, this framework can help participants and researchers in the learning network to generate questions for discussion. For example, what value do practitioners place upon innovative practice? Such questions can help ensure that the complexity and inter-relationships between issues are addressed when considering the renewal of careers guidance as a key service to education and training.

For the second key strand Brown & Attwell (1999) have produced an overview of how computer-mediated collaboration and knowledge transformation processes can support a community of practice (in that case of Vocational Education and Training Researchers in Europe). How we draw upon the theoretical framework developed to explain processes of organisational knowledge creation (Nonaka & Takeuchi, 1995; Nonaka & Konno, 1998) to provide an additional theoretical underpinning for our project is outlined in the linked paper of Attwell and Brown (2000) describing knowledge development in the CEDEFOP Research Arena. In this case knowledge transformation for a learning community to enhance careers guidance practice will involve a mix of real and virtual encounters. We are using a social model of knowledge creation, and the key process for genuine knowledge transformation to occur is that knowledge has to move from the individual level into wider communities of interaction that cross organisational boundaries.

The project will involve the spiralling of knowledge creation and transformation through and across different themes. The dynamic structure of the telematic environment will also allow material and ideas to be rapidly transferred between themes. That is, it will not involve a static accumulation of different materials, documents and information, but rather it will possess the dynamism to continually create new knowledge. Within this vision the role of the telematic platform (Guidance Arena) is to provide a rich virtual knowledge environment to support the processes of collaboration and knowledge creation and transformation in the learning community developed to enhance careers guidance practice as a key service to education and training.

INNOVATIVE USE OF TELEMATIC TOOLS TO SUPPORT A PROFESSIONAL COMMUNITY OF PRACTICE

We are attempting to align pedagogic processes and a web-based knowledge environment to support the processes that lead to the development and use of new knowledge in an innovative way. But for this to happen we need a deeper understanding of the ways in which individuals and communities of practice communicate and the ways in which communication leads to knowledge development. Professional knowledge can itself regarded as a personal synthesis of received occupational knowledge and situational understandings, derived from experimental learning, which are capable of being further transformed through a process of critical reflection. As expertise develops, and new contexts are utilised in the performance of practice, so the processes of research, review and reflection can lead to the creation of new forms of knowledge (Engeström, 1995). Continuing professional development can play a role in making these processes explicit such that others too can share in the developmental process. We will study the community of practice in its socio-cultural setting to uncover some of the reasons, issues and problems that make the use of these technologies successful or unsuccessful. This is intended to be a formative and iterative approach as the management of the system will change in reaction to the evaluation. We will adapt methodologies of systems design that are firmly based on socio-cultural activity theory (Engeström and Cole, 1993). Kapetelinen and Nardi (1997) have produced guidance that will be incorporated into the evaluation approach. As well as a commitment to the practical utility of the system being developed, we also intend to investigate some broader research questions. These questions include:

- is it possible to develop and sustain a learning community to enhance careers guidance practice as a key service to education and training;
- is it possible to provide a comprehensive telematic platform for collaboration, including interactive and focused knowledge sharing and transformation for the Careers Guidance community of practice;
- what are the pedagogical aspects of the innovative use of telematic tools to support a professional community of practice that influence how a learning community develops?

The basic infrastructure of the telematic platform is more fully described the linked paper of Attwell and Brown (2000) describing knowledge development in the CEDEFOP Research Arena. A simple Web authoring interface has been developed that will allow users to render and annotate documents. This means all users will be able to produce structured documents. The prototype communication and knowledge transformation tools have been produced through intensive collaboration with practitioners. The knowledge transformation tools allow for the contextualisation, 'tailoring' and enrichment of research results through further processes of knowledge transformation and creation. Further technical development, refinement, monitoring and reviews of electronic architecture (including the tools for knowledge transformation and collaboration) will occur throughout the lifetime of the project.

MATERIALS PRODUCTION IN THE KNOWLEDGE CREATION PROCESS

The telematic platform for interactive and focused knowledge sharing and transformation involves eleven central strands. All material will be coded in XML, allowing for varying representations of material drawn from the different strands (Attwell & Brown, 2000). The strands will not remain as discrete areas rather material will be dynamically created on a thematic basis. The eleven strands are:

Introduction to the site:

material relating to the purpose of the site; aims, objectives and project description; invitation to collaboration; opportunity for general comments

Material from direct practitioner experience:

this could relate to identification of core problems of guidance practice; 'good practice'; project work; critical reflection upon experience; implementation of special programmes; use of 'tailored' tools; evaluating practice; how the new system of personal advisors is operating in practice

Material relating to policy development and implementation:

key elements of policies; commentary, analysis and discussion; range of stakeholder perspectives; development of evidence-based policy; policy and programme evaluation; development and implementation of the new Connexions Service

Reference material:

labour market information, analysis, forecasts and intelligence; skills observatory; education, training and employment pathways

Research material:

on guidance practice (interviewing; group-work; ethics) and related issues (social exclusion; refugees; labour market transitions; identity formation processes; completion rates in education and training; equal opportunities). Research findings will be drawn from pure and applied research. Practitioner research will be particularly encouraged.

Training material:

changing contexts and curricula for training; training exercises; video material on interviewing; 'good practice' exemplars; moderated discussions; assignments

Tools:

supporting the development, testing and evaluation of tools and materials for use in careers guidance

Signposting material:

reference to other sites and sources of information

Student material:

project work; assignments; sharing of experiences; developing expertise

Evidence of continuing professional development:

evidence of reflection upon practice; professional model of regular supervisory practice; portfolio creation

Evaluation material:

responses to use of telematic tools and environment; links to practice; critical reflection; dynamics of interaction; continuing feedback

COLLABORATIVE ENVIRONMENT

The environment has to be used interactively and collaboratively if it is to be a genuine shared space for knowledge transformation. The interactivity within the rich evidence environment comes from the ability to:

- (jointly) develop, edit and modify materials;
- share annotation on material (annotation will be available alongside the material, not simply as a 'thread' as with existing CMC systems);
- facilitate the sharing of experience;
- promote discussion, sharing and active collaboration;
- offer virtual (and real) spaces for debate and collaboration;
- support action research;
- offer active support and moderation;
- offer support to particular interest groups (e.g. managers; those assembling evidence of continuing professional development; students etc.);
- contribute to a forum for discussion of attempts to tackle complex problems in authentic contexts.

CONCLUSION

The process of building a Guidance Arena comprising a rich knowledge environment (accessible to all through the web), that uses telematic tools for collaboration and knowledge development, is still in the early stages of development. The intention is that this should act as an essential support for establishing a learning community of careers guidance. We are interested in extending our collaboration, and we would particularly welcome the involvement of those who are interested in the substantive issues of careers guidance practice or in how to offer virtual support to dispersed communities of practice.

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DOING THE RESEARCH IS ONLY HALF THE JOB: THE IMPACT OF VET RESEARCH ON DECISION-MAKING

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Index: Vocational education and training; Educational research; Information dissemination; Research utilisation; Policy development; Decision making

Abstract: In this paper the proposition that vocational education research ought to have a greater impact on theory and practice is explored. The development of a new approach in Australia is outlined. This approach is based on three key elements. First, was a deliberate strategy over the past decade to increase the amount of research being undertaken. Second were steps taken to improve the relevance of that research to policy development and decision making processes. Third is a variety of ways now being instigated to ensure the utilisation of that research by various stakeholders in the vocational education and training sector. The key message is that doing research is only half the job.

INTRODUCTION

During the 1990s a new theme began to emerge in the international literature about education research, including vocational education research. That theme concerned the notion that such research ought to impact on decision making and policy in a more substantial way than had occurred in the past. Bengtsson (1997) described such a trend in the work of the Organisation for Economic Corporation and Development (OECD), and OECD (1995), Hegarty (1999) and Rokika (1999) document examples from a wide variety of countries around the world about the greater utilisation of education research in decision making.

Despite these developments, it is clear that too often policy and decision making processes remain quite separate from research processes. Major decisions are taken without any direct reference to research. Much research remains 'researcher or curiosity driven' with no direct relevance to the policy relevant issues, let alone being part of the policy process.

In this paper, we explore some major developments in vocational education and training (VET) that have occurred in Australia in recent years to try to ensure that VET research plays a much more direct role in policy and decision making.

INCREASING THE AMOUNT OF VET RESEARCH UNDERTAKEN

Research in VET in Australia has grown rapidly in the past decade. Significant programs of research, statistical collection and analysis are under way. Research in this area is undertaken within key research centres, in universities, in VET institutions and within State and Territory training authorities. The National Centre for Vocational Education Research (NCVER) is a national publicly funded agency which oversees and co-ordinates much of this research, as well as undertaking its own in-house program of research. NCVER also manages national surveys and collects national VET statistics.

However, Australia entered the 1990's with a very small VET research base. There was a paucity of VET research, apart from the modest program of research carried out at that time by the National Centre for Vocational Education Research. A number of commentators pointed to a lack of VET research in comparison with other sectors (McDonald et al 1993, Ramsay 1993, Butterworth 1994). Even more pertinent were the findings that this lack of VET research meant that research was a much lower than optimal influence on the formulation of VET policy and practice in Australia (Hall 1993, McDonald et al 1993, Wiltshire 1993, Robinson and Thomson 1998b). This history has been extensively documented in Selby Smith et al (1998).

The vastly improved contemporary effort in Australian VET research began with McDonald et al (1993) in the release of a key report on the state of Australian VET research called *No small change*. This report contained proposals for a national VET research and development strategy. Subsequently the Australian National training Authority (ANTA) established The ANTA Research Advisory Council (ANTARAC) in 1994 to increase the volume, scope and coverage of VET research. This led to a substantial increase in the funding and coverage of Australian VET research. These developments are described in Hawke and McDonald (1999). This included the growth of new research centres in addition to the NCVER so that some 20 centres undertaking VET research were operating by 1996.

Arrangements for the management of VET research in Australia were further reformed in 1996 with the rationalisation of the then separate NCVER and ANTARAC activities under the one set of national VET research arrangements that are managed by the NCVER (see Robinson 1997, Robinson and Guthrie 1998).

Central to this consolidated approach to VET research was the development of a unique national policy in 1997. This policy – *The national research and evaluation strategy for vocational education and training in Australia 1997-2000* – set the parameters for a concerted national approach to VET research in Australia. The policy was published in 1997 (NCVER 1997). The key elements of the policy are described in Robinson (1997). Almost 100 new research projects were commenced or completed in the first two years of the policy (see Robinson and Guthrie 1998), an effort which has continued since.

McGaw (1999) recently examined the impact of two major early 1990s reviews of education research in Australia. He concluded that the *No small change* review (McDonald et al 1993) had had a very major impact on changing the scope and quantity of VET research in Australia, whereas the other reviews of education research more generally had not (McGaw et al 1992). The key difference (according to McGaw 1999) is that action to initially act on review findings fell to a single agency – the Australian National Training Authority – in the case of VET research, whereas for education research more generally concerted action would have been required from a complex plethora of education agencies and institutions, and this did not materialise.

The nature of Australian VET research over the 1990s is examined in Robinson and Thomson (1998b), Robinson and Guthrie (1998) and Stevenson (2000).

INCREASING THE RELEVANCE OF VET RESEARCH

Australia's national VET research policy – *The national research and evaluation strategy for VET 1997-2000* – was based on two key elements designed to improve the relevance of research to policy and practice in the VET sector, which were:

- to hold widespread consultations with the key stakeholders/potential users of VET research to shift the emphasis away from 'researcher driven' research to ensure research priorities reflect VET stakeholder needs and requirements
- to base the research priorities on the national objectives for VET identified in Australia's national VET policy—'*A bridge to the future: Australia's National Strategy for Vocational Education and Training 1998-2003*' (see ANTA 1998).

This process culminated in six key research priorities being identified in Australia's national research policy, these being research into:

- the economic and social implications for VET
- employment and workforce changes and the implications for VET
- pathways from school to work
- the outcomes of VET
- the quality of VET provision
- future issues affecting the VET sector.

INCREASING THE UTILISATION OF VET RESEARCH

In recent years NCVER has published a couple of extensive and academically thorough reports on the impact of VET research on policy These were *The impact of research on VET decision-making* (Selby Smith et al, 1998) and *The impact of R&D on VET decision-making: A range of case studies* (Selby Smith 1999). Essentially this work found that the key impact of VET research in the past has been indirect, with research results feeding into the 'conventional wisdom' about issues, rather than directly impacting on particular decisions. Very often key decision-makers are using research results without being aware they are doing so.

Selby Smith et al (1998 p.21) found that 'The research enterprise is accumulative. Much research does not stand on its own as a piece of work, but adds to what existed before. This accumulated body of knowledge contributes in decision making to the creation of a climate of opinion and the development of a set of ideas, so that at any given time certain ideas, approaches or ways of thinking are in "good currency" while others are not.'

While this is useful, it is clear that if a concerted effort is made to make research and statistical analysis much more relevant to the contemporary needs of policy-makers, enterprises, VET authorities, VET providers and other stakeholders, then a much bigger and more direct impact from all this work can and does arise. A marketing study commissioned by NCVER (Figgis 1998) suggested the key is to alert people to the fact that there is a research story and then tell the research story properly.

In response to these notions the NCVER is now putting as much effort into developing new ways to promote research usage, as it does into doing the actual research. Over the last few years, NCVER has been focusing increasing amounts of its attention and resources on ensuring that what it does, and manages, is produced and disseminated in forms which are useful to those in the sector.

A number of different approaches have been developed. These are described in more detail in Robinson (1999a) and include—

Core publications: Firstly, there is still a need for publications of the primary research findings information including research reports, journals and journal articles and conference papers. There is also a place for the main statistical publications derived from the national data collections and surveys. NCVER published more than 100 reports in the past year, as well as a scholarly journal (*Australian and New Zealand journal of vocational education research*) and a magazine (the *Australian training review*). Attention has been paid to producing better written and better focused executive summaries of these publications, and workshops have been run for Australian VET researchers to develop their skills in this area. However, it needs to be recognised that these primary reports tend to reach the research community rather than other stakeholders such as practitioners and policymakers. Therefore, other approaches have been taken in tandem with the publications.

Going digital: NCVER has made significant improvements over the past year to its web site and this will increasingly be the main platform used for its delivery of VET research and statistical information. New features on the web site include: research and statistical sections, summary pages for each research project, current news and events, downloadable publications, a greater number of full-text electronic publications, e-mail contacts for key staff, sophisticated auto-linking between related documents on the site using metadata, online project tender information, online registration for conferences and forums.

VOCED database: The Vocational Education and Training Research Database (VOCED) has been significantly upgraded over the past year to become a truly international research tool, providing information about VET research, policy and practice gathered from a wide range of Australian and international sources. This database has been made freely available on NCVER's web site, and is thus readily accessible to all stakeholders in the sector. This will be the subject of a presentation at the second part of this workshop.

Media: It is vital to make sure that key and current VET issues are mentioned in the media, both the specialised education media and where appropriate the mainstream media. NCVER has embarked on a more strategic program of placing research results in the various media to ensure that the outcomes of research are known about and thus do become part of the conventional wisdom.

Value added products: NCVER has begun to publish new types of research publications which are specifically designed for policymakers and others who do not need or wish to read long reports. They are known as 'at-a-glance' publications and draw together key points on a particular topic that emerge from the research findings and the statistical data we have gathered. They report on the key research results that emerge from a body of recent research work (rather than on the results of a single new research study) about a topical issue. The research studies covered include new NCVER research *and* any other relevant research. These have been very well received, as they offer an easy to read analysis of key information on issues of current relevance.

Getting the message out face to face: NCVER has continued its program of conferences, workshops and seminars, but has targeted these at specialised audiences in preference to hosting a large diffuse conference as was the practice in the past. In particular, workshops and forums have been held in capital cities across the country to provide direct information about research and trends in key areas to the people who work in VET and the people who make decisions in VET. The most important new development, however, has been the deliberate targeting of a new audience for research results – that being senior policy makers and advisors. Thus the NCVER has run face-to-face briefing sessions with senior government officials, training bodies and training authorities, employer organisations and union leaders about key developments and new research findings.

CONTRIBUTING DIRECTLY TO POLICY DEVELOPMENT

Better use of the research effort is a very useful exercise, but getting research to be an integral part of the policy development process is an even more potent way of ensuring that research can have a real impact on shaping VET policy. This theme was explored by Bengtsson (1997 p.167) who argued that the report '*Education research and development: trends, issues and challenges* (OECD,1995) makes it clear that the linear model between the education researcher and the policy maker is on its way out and is being replaced by a much more interactive model in which three sets of stakeholders work together: researchers, practitioners and policy makers'.

An example of how the NCVER has been developing this approach in Australia in relation to research and policy development of Australia's apprenticeship and traineeship system is described below.

- Australia commences with a New Apprenticeship system in January 1998 based on reforms to the pre-existing apprenticeship and traineeship systems
- NCVER research (Robinson 1999b) shows that while extensive research was involved in establishing traineeships in the mid 1980s, little research had been conducted into apprenticeships and traineeships since that time
- NCVER releases a range of new statistical publications showing apprentice and trainee trends and developments
- During 1999 the NCVER embarks on a series of face-to-face briefings about apprenticeships and traineeships with government officials, national employer bodies, industry training oganisations and national trade union leaders
- During 1999 the NCVER decides to undertake major new research in apprenticeships and trainees. 12 new research projects are commissioned. By the end of 2000 two major reports will be released. These are an NCVER report providing one of the most detailed analyses of apprentice and trainee trends, developments and emerging issues ever undertaken, with an accompanying volume of authored research papers reporting the findings of the new research studies that are being conducted
- Late in 1999 the national minister calls together national employer organisation to discuss emerging trades skill shortages. NCVER is asked to provide a presentation at the meeting
- Three employer-led working groups are established to examine trade skills shortages and the electrotechnology, metal fabrication and engineering, and automotive industries. NCVER is one of the members of each working group and provides considerable analytical input to each working group's report back to the minister. The working group's findings are presented to the Minister at a National Skills Forum in April 2000, together with the announcement of new policy responses
- Early in 2000 the heads of Australia's training authorities request that NCVER commission a major new work to look into reasons why some apprentices and trainees fail to complete their training and make recommendations about what strategies might be put into place to address the problems the research identifies
- Three new national skills working groups are announced in April 2000 to examine trade skills shortages in the building and construction, food and rural industries, with NCVER membership again being invited

This demonstrates in a very tangible way how more emphasis on the dissemination and utilisation of research results has developed into greater calls for research and analysis to become more integral to policy development itself.

CONCLUSION

In this paper we have examined the different ways in which research can have an impact on policy development, so that real improvements to the quality and effectiveness of VET can result from the research, information-gathering and analysis effort. Australia's National Centre for Vocational Education Research has responded to this challenge by changing the ways in which the information about VET research and statistics which it produces, manages and collects is disseminated to all stakeholders.

The new approaches focus on: making sure that VET research is focused on the real information needs of key groups in the sector; making sure information is produced in a variety of forms and that it is timely, useful and has the maximum impact; improving the quality of the publications and making them more accessible; producing products which consolidate and report on a range of the research and statistical work conducted on key issues and topics of interest in the sector; ensuring that as many as possible have an opportunity to see and hear what we are doing.

This approach is evolving in a new and exciting way that leads to a quite different chronology. This is when the need for policy development itself instigates the research. Instead of asking how to make research relevant to the decision makers, perhaps a better question is how policies can be made much more relevant and useful, and durable. The answer is that they must be backed by sound research. A better balanced strategy is achieved when people are appointed to undertake genuine investigation, with fiscal responsibility and political cognisance. There is need for a fine balance between genuine enquiry and real political possibilities. Part of the role of a national research organisation like NCVER is to maintain that balance. Consciousness of the need for policy relevance should be there from the ground up, in the planning and undertaking of research and the dissemination of the findings.

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NCVER'S WEB SITE AND THE VOCED RESEARCH DATABASE

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Index: Vocational education and training; Database; Educational research; World Wide Web; Information dissemination; Information network

Abstract: This paper discusses the use that Australia's National Centre for Vocational Education Research (NCVER) makes of the World Wide Web as a major platform in its dissemination of vocational education and training (VET) information, the importance of which was explored in the first paper. The session included a live demonstration of the web site, with a particular focus on the VOCED research database. Over the past year, NCVER has extensively upgraded its web site, to provide an integrated and sophisticated source of VET research and statistical information. During this period, the VOCED database has been significantly enhanced to become a leading international research tool, containing information about VET research and policy from Australian and international sources, from 1995, and indexing a wide range of key journals in the field.

INTRODUCTION

Chris Robinson, in the first paper of our symposium, made clear the importance placed by Australia's National Centre for Vocational Education Research (NCVER) on the dissemination and utilisation of its research and statistical information about vocational education and training. For research to make a real difference and to have an impact on both policy and practice, the message about the research must get out to all those who need it. Getting this message out is as important as the production of the information by doing the research.

NCVER collects national statistics and undertakes and manages a large number of research projects each year. We thus hold a vast amount of research and statistical information about vocational education and training and have developed a range of strategies for getting this information out to the people who need it. One of the chief vehicles for delivering this message is the World Wide Web, which enables us to use a very flexible and powerful mechanism to deliver large amounts of information at a relatively small cost. The Web is the most effective way to reach a wide range of people, as it becomes increasingly more widely used, in Australia and in the rest of the world.

This session will outline our strategy for NCVER's web site as a whole and then look particularly at our *Vocational Education and Training Research Database* (*VOCED*), which has undergone a major enhancement over the past year.

The approach we have adopted with the web site is to offer an integrated service, so that our users can find both research and statistical information about their specific topic or topics of interest. Users can browse by category, or can use a free text search across the whole site. Information is kept as current and up-to-date as possible, a very important advantage of web technology.

We take a continuous improvement approach to the web site as a whole and this session will demonstrate how we have implemented new features in *VOCED* in response to clients' feedback. We seek responses from our users, and because the site is developed and produced in-house we are able to respond to comments and add refinements. The site offers flexible and sophisticated searching mechanisms and is metadata driven for greater efficiency. An advantage of the web is that we are able to gather statistics about usage of the site, to monitor usage and see the growth in access.

This session will demonstrate features and services we have developed on the site as a whole and outline plans for future developments. The presenter will then look in detail at the *VOCED Research Database*, outlining the major enhancement project we have undertaken, and demonstrating the range of material now covered in this database as well as features of the search engine.

NCVER'S WEB SITE

http://www.ncver.edu.au

The following features will be demonstrated:

and to the key functions of the site. These links are maintained on each page of the site. All pages on the site follow the same clean design (to promote speed) and have the same 'look and feel' for coherence. Content is updated regularly. The mouseover feature allows extra information to be added without cluttering up the page. Address and contact details are provided on the front page – people shouldn't have to delve too far for this information.

NCVER structure and corporate information. Information about the organisation's aims, role and structure is provided, with photographs of managers and names and email contacts for key staff and functions.

NCVER news. Current and recent information is provided, with links to external sites where appropriate (contacts for conferences, etc). Email subscription to this newsletter is under development.

New web pages are featured so that regular visitors can quickly find changes.

Other key areas of the site: Library, Reading room, Bookshop, Links, Sitemap.

Research information. Research information is organised under themes, projects and currency, and can also be searched by key words. The master page for each research project contains links to all related information about that project, and also leads to further information about the research topic or the author. Increasingly, full text of publications (reports and papers) is available for download.

Statistical information. Statistical information is grouped under four main areas: national collections, surveys, selected topics and the AVETMIS Standard. Full text of many documents is available. It is planned to add metadata to all statistics pages (including tables and charts) on the web site so that they can be searched separately.

A full site search, from the sitemap area, will retrieve material about that topic from both the research and statistics areas, as well as other general information.

Further developments for the site as a whole include: increasing numbers of NCVER publications available in full for electronic download, in pdf format; an enhanced annotated VET links service, available as a searchable database; extension of the metadata used on the site, to incorporate all research and statistical information; online forums provided, based around particular topics of current interest; full online ordering service available from the bookshop; search facility added to the newsletter archives.

VOCED RESEARCH DATABASE: BACKGROUND

VOCED is produced at NCVER with the support of Australia's national VET clearinghouse network. The network has existed for over 20 years, and was set up with the aim of avoiding unnecessary duplication of effort in technical and further education (TAFE) research. This aim of course remains a key focus of our work today. The TAFE Clearinghouse was modelled on the ERIC Clearinghouse concept, where information related to published and unpublished material (in this case about vocational education and training) is sent to a central point from various formal nodes as well as from individuals, thus forming an information network. The Clearinghouse started with six State and two Territory Clearinghouses, plus the National Clearinghouse. In 1989 the title of the network changed from National TAFE Clearinghouse to National Vocational Education and Training Clearinghouse, reflecting the increased coverage of the information beyond just TAFE to incorporate information from the entire VET sector. The *Vocational Education and Training Research Database (VOCED)*, also came into existence, incorporating the two existing hard copy publications (*Initiatives in TAFE* and *Projects in Progress*), and produced in an electronic version (distributed on diskette) as well as hard copy. Since then it has been produced quarterly, and now contains almost 15,000 records, of which about 4,500 are international entries.

The network itself has expanded to its present structure, consisting now of a Clearinghouse in each State and Territory, an adult education Clearinghouse based in the Council of Adult Education in Melbourne, a New Zealand Clearinghouse, a local UNEVOC Clearinghouse and the National Clearinghouse at NCVER. Each local Clearinghouse captures information on vocational education and training from its own area, houses the documents, sends abstracts, indexes and bibliographic information about the document or projects to the National Clearinghouse, ensures access to the documents themselves and distributes and promotes the database to its own constituency.

The National Clearinghouse at NCVER is responsible for producing the database from this information, maintaining its quality and consistency, capturing national information and other information not covered by the network, and co-ordinating the network as a whole. This system has worked with goodwill and a spirit of co-operation for 20 years. The Clearinghouse officers throughout the network are a highly committed group of people who are driven by a strong ethic of collaboration and information sharing, and this is one of the reasons for the successful continuation of this system.

The new developments in the Clearinghouse and database are building on a solid foundation developed over many years - the network is a well set-up and healthy co-operative venture, where all users benefit and can see that they benefit. The Australian TAFE systems which house the local Clearinghouses contribute to the network by providing time and labour; they benefit by having ready access to a mechanism for promoting their information, and for obtaining timely and relevant information themselves. As more TAFE institutes become interested in undertaking research, and in producing reports on their findings and on initiatives in their practices, they can see the benefits of being part of a national coordinated system for sharing this information.

The information contained in the database includes:

- research reports
- information about current research (projects in progress)
- conference papers
- theses
- journal articles

- policy documents
- government reports
- evaluation studies
- survey results
- published statistics
- bibliographies
- electronic documents

These are not kept in full text in the database, but are housed in the Clearinghouse, and for Australian users every document entered is available by some means (usually interlibrary loan) from a specified source. Wherever possible, a second point of availability is included so that international users are given a way of obtaining the full document. Increasingly, documents are available on the web, and where this is the case a link is made to the full document from within *VOCED*.

Each entry in the database contains a brief abstract or description of the document, an extremely valuable aspect of the database. Contact information is provided for current projects.

VOCED RESEARCH DATABASE: ENHANCEMENTS – RECENT, CURRENT, FUTURE

Access via the web

Enormous changes to the potential usefulness of the database resulted from mounting a web version. This has many benefits: users can have access from their own desktops, without relying on knowing that the system is installed in a library somewhere. They can use the mouse and hyperlink features, and cut and paste text. They can use the e-mail links to clearinghouses provided on the web site to request items and they can submit information to us about projects or documents online. It has become a truly interactive and accessible database. Our feedback from clients about the interface has been very positive, with very few enquiries about how to use it. We have provided help information and examples on the site. Our statistics kept over the first 18 months since *VOCED* was mounted on the Web showed a steady 400 actual searches performed each week. This initial high usage for such a specialised database has increased over the last year to an average of 800 searches a week, indicating the success of the enhanced service.

With *VOCED* on the web and readily accessible to all users around the world, we were poised to expand to become providers of a truly international tool, and to increase its coverage to include not just more Australian material but key international material as well.

Increasing coverage – becoming international

VOCED has grown from what was a national and somewhat limited, though useful, database, to become a leading international research tool for the field of VET. To increase coverage, we have been adopting a number of strategies.

Firstly, strategic alliances with relevant organisations, initially the 20 or so research centres which have been set up around Australia and are undertaking research into VET. The research context is very different now from when the Clearinghouse was first set up. Research is now not just done in the TAFE and training authorities, but in many specialised research centres, in universities and TAFE Institutes. NCVER has signed memoranda of understanding with over 20 of these centres, whereby, among other areas of cooperation, we agree to exchange documents. This means that in exchange for all of our publications, these centres send us everything they publish, of relevance, and we can then include it in the database. This results in the capture of a significant portion of key Australian VET research material.

Secondly, NCVER now plays a central role in coordinating the dispersal of funds for the national managed research program, overseen by NREC, the National Research and Evaluation Committee. This means that as soon as a project contract is signed, we can put the project information into the database, and we also have speedy access to the published outcomes, for inclusion in the database. We liaise closely with the section managing the NREC funding so that we can gather this information quickly.

With these two strategies in place we are able to be far more proactive and ambitious about capturing Australian VET research information. Where before *VOCED* had many acknowledged and frustrating gaps in its coverage, we are now in a position to aim to be comprehensive for Australian research information.

As well as becoming more strategic in acquiring information, we have also become more focussed on the nature of our core information. *VOCED* contains information on VET policy and training systems, VET research, VET practice including "how to do it" information from practitioners, and published statistics (ie not raw data). We no longer include curriculum material, as we did to some extent in the past – this is too vast a field and there are other sources for this.

We have also set up similar MOUs with a number of international organisations, so that we can also be sure of capturing all their publications. These are at present: South East Asian Ministers of Education Organisation Regional Centre for Vocational and Technical Education (SEAMEO VOCTECH), Colombo Plan Technician Staff College (CPSC) in the Philippines, the Overseas Vocational Training Association (OVTA) in Japan and the Korean Research Institute for Vocational Education and Training (KRIVET). Further agreements with the European Centre for the Development of Vocational Training (CEDEFOP) and the German Federal Institute for Vocational Training (BIBB) have just been established and an agreement with the Central Institute of Technical and Vocational Education (CITVE) in China is about to be signed.

We have a very strong link with UNESCO's UNEVOC program, including a local UNEVOC clearinghouse node, and are in the process of developing an agreement with Adelaide Institute of TAFE to become a joint regional UNEVOC Centre of Excellence, one of whose platforms would be the production of the *VOCED* database, as a vehicle for all VET research information published in English, for and from UNEVOC members.

Our strategy for acquiring information for *VOCED* is essentially a two-pronged approach. On the one hand, we make use of all of our networks: the Australian national clearinghouse network, the Australian research centres, the Australian national managed research program and the growing group of international partners, and the online submission mechanism, to acquire a wide range of material which is sent directly to us. This does mean we have a large amount of more obscure and rare documents, including unpublished papers and material from the Asia Pacific region which is unlikely to be held by any other database, and which is one of the great strengths of *VOCED*. On the other hand, to ensure the widest possible coverage, we have also strategically and systematically set about funding the acquisition of key material from a number of key sources.

Journals

In the past, *VOCED* did not routinely index many journals. Our coverage was sparse and sporadic. Now we have identified an initial set of key journals in the field and acquired them for the collection, backdated to the beginning of 1995. Our list of both Australian and international journals is now over 130 titles, and we are constantly looking for new ones. We have added 10 new titles this year. The next stage of the project will include an evaluation and refinement of our core list of journals. We are always keen to receive feedback on this list, which is itself published on the web site, with each title linked to its entries in *VOCED*. The list itself is a valuable resource.

Monographic publications

Similarly, we have at the same time set up a process of identifying key international publishers and organisations which produce relevant monographic (single) publications in the field of VET research and policy. These include the obvious ones such as OECD, CEDEFOP, the ILO, NCRVE in the US, etc but we want to cast a much wider net and identify the key research organisations in the area in a wide range of countries. Again, any suggestions here would be warmly welcomed. I have a list of over 140 organisations at this stage, which we may put up on the web as a resource in a similar way to the journals list. Again, we are going back to 1995 for our acquisition of this material as well. Most of these organisations have web sites and will eventually be included in the "annotated VET links" section of our web site.

Implementation phases

The enhancement is taking place in two phases. The first phase, of identifying, acquiring and indexing the backdated material, is almost complete. It began in March 1999 and will be finished by the end of September 2000. We have ordered approximately 100 new journals, acquired the back issues to the beginning of 1995, and have indexed them, working from the most recent to the earliest. We have also acquired large numbers of international monographic publications (over 2,000) for indexing, from about 150 different international organisations so far.

We are using a team of in-house indexers to maintain our existing very high standard for entries. For *VOCED* to be a world class international database, it is crucial that the quality of the abstracts and the assignment of index terms are to the highest possible standard, and part of this project has involved the refinement and development of our existing standards and guidelines for data entry.

As well as the high quality of the entries, the range of its coverage, the fact that it is free to use and the backup document delivery service, *VOCED* has another significant advantage: its timeliness. Because we put the entries in ourselves at NCVER as soon as we receive the material, there is rarely a wait of more than three months (our upload period) before an entry appears in the database for a publication. This is in striking contrast to the time taken for material to appear in many other databases. We hope always to be able to maintain this currency of the items in *VOCED*, and we urge all users to send us information about projects and documents as soon as possible so that they can go up onto the web quickly.

The maintenance phase will continue after September 2000 with 2 full-time continuing indexing positions, a consolidated list of evaluated serials, and a list of target organisations to monitor for publications. Our strategy of alliances with various organisations to acquire their publications for the database will continue. We anticipate that *VOCED* will by then be an indispensable tool for VET research and a first port of call for anyone in Australia (and indeed the rest of the world) who is seeking information on vocational education and training research.

It is important additionally to note that *VOCED* not only provides a single point for Australian VET researchers, policy makers and practitioners to access international information, but also offers an opportunity for those in the Australian VET community to showcase their research and policy information. A search in *VOCED* now results in a consolidated set of results which is a mix of Australian and international material. In providing this tool, one of our aims is to enable Australian researchers more easily to cite international research in their own papers as well as to promote their own work in the international arena. Australia has a thriving and focussed VET research program, which has much to offer the rest of the world, as well as much to learn from international research and policy material.

Further refinements to the *VOCED* search

Several refinements to the *VOCED* search mechanism have just been completed and we always welcome suggestions for more. One of the advantages of developing the tools in-house is that we can customise the search engine and be responsive to users' comments, requests and suggestions.

The new improvements are:

- Truncation of the search term
- Linking the search to an online thesaurus for automatic checking of key terms
- Returning the set of entries retrieved in a format which is compatible with bibliographic programs such as EndNote.

These changes are complex in themselves, but they will make searches easier for the user, and we have made various decisions about how to present the new functionality in the search interface which need to be evaluated by our users.

Other planned changes are:

- Modification of searches by date
- Adding "pathfinders" to the web site
- Putting the thesaurus itself on the website for browsing and use by other sites, in particular for metadata
- Developing Z39.50 compliance so that *VOCED* can be compatible with other web databases and can more readily be part of internet gateway or portal sites

DEMONSTRATION

The second part of the workshop consisted of a demonstration of the *VOCED* research database on the web, with examples chosen to show different kinds of searches and the range of material now covered.

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THE RENAISSANCE OF VOCATIONAL EDUCATION AND TRAINING: MISCELLANEOUS HINTS FOR UNDERNOURISHED ELEPHANTS YEARNING TO DANCE

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Key word index: VET systems, management, competing influences.

Abstract: This article considers the influences on VET delivery and highlights concerns for systems contemplating change. It comments on the purpose of VET and the way VET systems are managed.

Most publicly funded Vocational Education and Training (VET) systems throughout the world, dressed in their various garbs, are elephantine and bureaucratic. Whilst there are notable exceptions, most hobble along, weighed down by a miscellany of agenda, in a world moving at cyberspeed.

Globally, VET is at the crossroads. The renaissance of global VET requires energy stimulated by a vision of tomorrow rather than the frameworks of today or yesterday. In attempting to reinvent its value, in an era marked by exponential change and discontinuity, it is at risk of accepting that any new direction is good enough. If the system does not know which route to travel, any path will do.

TRIANGULATED PILLARS OF VET MANAGEMENT

VET systems are predominately publicly owned and managed. Both the providers and the systems are subject to competing pressures and have been drawn into the reforms of the western world's public sectors. Public VET providers are largely centrally funded and controlled, with different levels of delivery-based autonomy.

Western-world VET sits in the eye of a storm rampaging simultaneously on three fronts: from the new world operating paradigm of globalization, evolving technologies, changes in work and social values; from higher education providers who, throughout the world, have experienced radical increases in student numbers without commensurate funding adjustments and thus have pursued new markets (such as VET); and from increased economic drivers resulting from public sector management reforms. Faced with this environment, distinct VET systems, if left unmanaged or managed in traditional bureaucratic ways, will become unsustainable and are likely to prepare students for a world that has disappeared.

It is difficult to make global statements about the world of VET. VET commentators within industrialized countries frequently ignore the basic needs of much of the world where two thirds of the global population can only access clean water by carrying it themselves from water courses and 80% of the world's population have never used a telephone, let alone sent an e-mail message. The industrialized countries, with only 15% of the world's population, contain 88% of all internet users. Even if appropriate telecommunications systems were in place, without literacy and basic computer skills, most of the third-world's population would still be excluded. To close the knowledge gap generated by technology and globalization, the first step is to address the learning deficit in the third-world where, in 24 countries, 20% of primary school aged children are not in any educational system.

The delivery of VET, irrespective of the host country, is supported by three pillars: money and economics ("the financial pillar"), political and ideological considerations ("the political pillar") and community, local and social issues ("the social pillar").

Social Pillar

VET providers usually discharge a significant social responsibility by reaching the unreached and including the excluded. VET expands access to education for the socially, educationally and economically disadvantaged. It is low cost, accessible and non-threatening. VET students commonly come from the lower socio-economic groups, many are mature-aged and most have no or no significant previous academic certification. VET fulfills a need for "second chance" education and retraining. VET also meets a social need for aligning education with the skills required in the future workforce. In many cases, VET providers pick up the pieces left by the failure of the economically driven markets to meet social obligations.

Political Pillar

VET providers support social infrastructure, contribute to regional growth, provide employment and are often significant local participants in economic development. As State owned organizations or at least largely government-funded bodies, VET providers react to the political ideology and imperatives of government. Efficient and effective program management does not necessarily achieve the social or political outcomes required by government. The political environment of public sector activity is an important influence on public sector management.

Financial Pillar

The raisen d'être for VET is not the financial well-being or strength of the provider or the system. It exists to meet a broader social value. However, governments expect their agencies to operate both effectively and efficiently. This is particularly so today, as evidenced by such programs as the UK's "Next Steps" initiative, New Zealand's "State Sector Reform Program", Australia's "National Competition Policy", Canada's "Public Sector 2000" initiative and the USA's "Reinventing Government" program.

Public sector managers have been induced away from an adherence to inputs-driven and formalized processes to an emphasis on optimal resource allocations, outputs-driven strategies and value for money. The key changes to the management of publicly funded organizations include a strategic management focus, a shift to quantifiable output measurement, the devolution of management controls within an agreed performance framework, a preference for private ownership and contestability in public sector service provision, the imitation of private sector management practices and an emphasis on cost-cutting and efficiencies.

Economic considerations are always high on government agendas. Governments and the public expect VET providers to operate frugally. That alone, however, is not enough. They can operate efficiently and still not achieve the social and political outcomes expected of them.

The nature and function of VET providers have substantially diversified in recent years. This has resulted in a diversification of funding sources (UNESCO, 1999, p.10) which, in turn, has intensified the focus on funding and financial efficiencies. In practice, the loose-tight controls of government may have been antithetical: loose when they should be tight, and tight when they should be loose. VET providers, with operating systems glued by public sector impediments, have been asked to act like businesses and have been judged like private providers (Queensland, 1998).

Diagram 1 depicts the triangulated model.

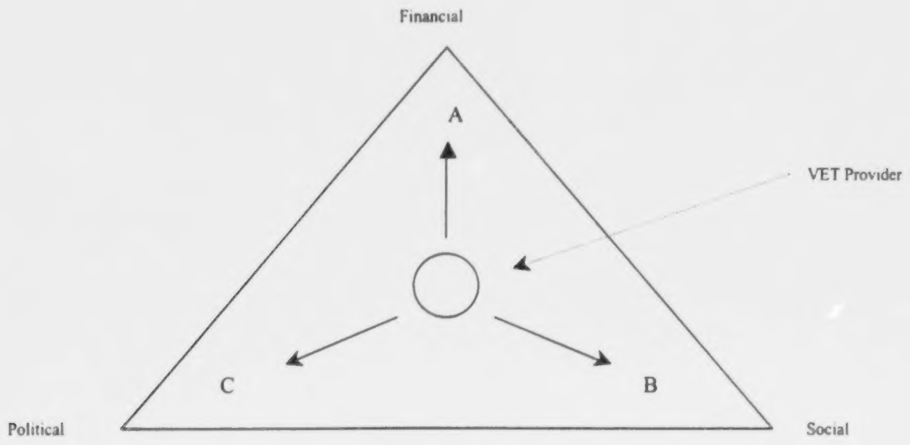

Diagram 1

Providers positioned at point A in Diagram 1 will only provide programs if they are profitable. In order to survive, their fee-for-service revenue must significantly exceed their government funding. They are unlikely to have many supporters in government as they divorce themselves from political imperatives and, more significant, from the community, social and support imperatives traditionally met by VET. They will have little connection with local communities.

Providers positioned at point B in Diagram 1 will be driven by the social pillar of VET provision. They will not pursue financial strength or short term financial profit and will probably be managed inefficiently. They ignore the short-term idiosyncratic demands of local politicians and the broader imperatives of government and public sector reforms.

Providers positioned at point C in Diagram 1 will be consumed by political imperatives and the demands of Ministers and local members. They will constantly divest resources to pursue short-term interests of stakeholders and will be unable to maintain any constant strategic growth consistent with financial survival. They ignore the broader learning framework of VET and will be unable to adjust to the contemporary needs of students and industry.

A provider often "bounces around" inside the quagmire of the triangulated framework propelled by the particular imperatives of the day. Different governments with different ideologies will attempt to position VET towards one or other pillar in the framework. It is unwise to accept long term positioning near any one particular pillar without embedding a flexibility to adjust towards another pillar should medium term circumstances dictate. This is due to VET's status as a tool that meets a variety of agendas. There is a trade off between the three pillars.

KNOW WHAT YOU ARE

VET is a difficult concept to define. Generally speaking, it is an outcomes based phenomenon. It is usually understood to mean all learning experiences that directly enhance the skills, knowledge, competencies and capabilities of individuals, required in undertaking gainful employment. VET provides technician, craft and trade type 'middle-level' skills and knowledge. It is essentially practical, applied, technical and job-related. However, rapidly changing technology, globalisation, organisational change, the development of the 'knowledge society' and the market-oriented, deregulatory policies of governments have blurred the boundaries of the sectoral/skill-level notion of VET. Its focus is on the nexus between education and training, in all their forms, at all levels, and employment, whether paid or unpaid, and the economy. It calls for a multi-disciplinary approach (Maglen, 1996).

VET is a process in pursuit of an outcome. What it is, is less important that what it produces: how it is delivered is less important than the product of the delivery process. Yet the scuttle-but of hearsay around VET corridors increasingly infers that VET in the new millenium may shift to become applied vocational skills defined by reference to pedagogue, basically work place (or application) based and applied learning, rather than the qualification produced, the skill level acquired or the employment opportunities which it creates. This, so the scuttle-but continues, is dependent on policy. Most VET providers see themselves as implementing government policy. However, policy creation and implementation are iterative and interwoven. To echo Mintzberg (1996), policy implementation involves policy determination and re-creation. Administration is not just a question of efficiency and rational rules: it inherently involves policy choices. In this sense, VET managers have a degree of autonomy independent from government. The key to shaping that independent capacity is to ensure that it is exercised speedily and in a way that is relevant for the world of today and tomorrow, not perpetuative of the world of yesterday. It is within this crevice of implementatory discretion that centralised, bureaucratic systems can leap forward into tomorrow.

FUNCTIONALITY OF VET

VET systems exist for the students and the creation of skills and competencies needed for tomorrow's world. The system itself has no intrinsic worth. Most state based education systems are a vertically integrated process and often a vertically integrated monopoly. Many western world public sector reforms have sought to unbundle the vertical integration by segregating the various parts of the process into different units, with these units then dealing at arm's length with each other. This process has been pursued, for example, in water, gas and power industries. It clarifies the cross-subsidies between zones of activity and makes the "chunks" of the process financially transparent.

Publicly owned VET providers are vertically integrated. To use a water industry analogy, VET providers control the data and knowledge catchment, storage, treatment and transportation. Global VET providers are very good at catching the rain and harvesting the raw materials. For many years, teachers and educators became experts at treating the raw materials to align them the required skills or, using our analogy, the type of water required. They are less adept at this today as the skills needed are changing rapidly. Interestingly, throughout the world, enormous resources and energy are being directed at developing mechanisms to address this gap. It is astounding, then, that so little attention or resources have been diverted to the pipeline – the distribution networks. Water engineers know that a weak pipeline causes enormous potential risk. The raw water may be of excellent quality, or poor water treated usually at a significant cost, but a leak in the pipe undoes all the hard work. Industry knows that you cannot sell the world's best product without a good customer interface and distribution network. Teachers have not received the same attention. In many countries, VET teachers are deficient in their theoretical or practical skills (UNESCO, 1999, p.7). A new model of the VET system should see the role of teachers re-appraised with skill mixes and pedagogue reinvented. Teachers will be re-skilled on the job and probably in their own time. They will acquire new entrepreneurial skills by an increased interaction with industry and the community. Using the water analogy, water engineers no longer invest in new copper or cast iron pipe when a cheaper more flexible and durable pipe can be used. If global VET should adopt a business model then it must recognize that no business spends so little on its distribution network and customer interface. Its leaders should reappraise the historical under-investment in teaching skill maintenance and development.

INNOVATION AND THE NET: ONE SIZE DOES NOT FIT ALL

VET organizations have objectives framed around learning. Different VET providers specialize in different disciplines or markets. Within faculties, there are sub-streams of interest and specialities of learning. One teaching methodology may not suit every type of learning process. Teaching is a process. Learning methodologies are processes. They are means to an end. One "size" does not fit all. Each particular circumstance needs to undertake assessments of appropriate methodologies.

The internet and web based delivery is a particular delivery and learning methodology. It will suit some types of programs and some students. The focus on internet delivery is important but it is not an all-consuming panacea for the future. It is a strategy that supplements other methodologies rather than supplants them. In the absence of the young generation of today cloning their learning attributes - and there is no evidence to suggest that that is so - then there is and will remain a demand and educational integrity in a variety of delivery methodologies.

In the discontinuous world of the new millennium driven by rapid technological change, globalization, economic uncertainty and diminishing resources, the real key to the future of a reinvented global VET provision is innovation (beyond flexible delivery), rather than planned structural processes. VET providers will be doomed by repressed, centralized, dictatorial managerial styles and curriculum morbidity. Testimony to this is the global difficulties experienced by curriculum developers in designing and unleashing traditional curriculum in a world that moves faster than the capacity of traditional curricula development mechanisms. The curriculum is often redundant before delivery. The answer, of course, is to build a curricula framework and leave the detail to devolved experts at the grass roots who can adjust it to suit the idiosyncrasies of the market and the students as they try to align their skills with the rapidly evolving needs of industry.

VET providers are, by their nature, professional organizations. They are best managed "bottom up" rather than "top down". Hierarchically driven power produces resource misallocation in highly process-oriented front line staff. The result is a need to recognize that the centralized systems must move towards autonomous devolution with a clear vision of the future. Managers must move to individual autonomy and be accountable for results and co-ordination, not processes. The processes should be the responsibility of the teaching staff.

The traditional worldwide catch-cry in VET is that there is not enough money. There is, of course, never enough money. The trick is to recognize that solutions must be pursued outside traditional frameworks. Are the processes, for instance, still the right processes? Staff need to be stimulated to look for solutions which require reallocation of resources rather than new resources. Organizations need to address what they do and why they do it. No longer is it enough to say that particular processes are in place because they always have been. The challenge for VET leaders is to find new and better ways of producing enhanced outcomes with fewer resources.

An important ingredient to an enhanced future therefore is managed devolution. That however should only follow clarity of vision. The immediate task for most VET leaders is to define the future of VET in terms of positioning, outcomes and parameters. They need to focus on the values VET delivers rather than the more difficult contemplation of the abstract purpose of VET.

VET AS THE PRIME GLOBAL LEARNING FRAMEWORK FOR TOMORROW

VET teachers are often passionate about their work. Passion, however, often resists change. Passion driven in a particular direction, within particular parameters, is a valuable organizational resource. Managers should inspire passion in their teachers, but provide a framework for its pursuit. Inspiration of passion in teachers is rare without engagement of the teachers in the broader debate and without inclusive and participatory decision-making processes.

As VET leaders search for their own solutions it may be wise to recall that in rapidly evolving environments an investment in a solution provides only one answer and leaves begging the solution to the next question. Frameworks to guide multiple solutions are often better structures to build.

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INDUSTRIALIZATION, THE NEW ECONOMY, AND THE OCCUPATIONAL WORK ETHIC

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Index: Occupational Work Ethic, e-learning, Vocational Teacher Preparation

Abstract: The entrepreneurial spirit is alive and well in the new international economy. The information age, the internet, along with e-commerce, e-communication, and e-learning are changing the way businesses and workers interact, communicate and problem solve. The challenges of these multitude of demands on today's workers has greatly altered our traditional knowledge of the world of work. Vocational educators and trainers worldwide are now faced with a myriad of training challenges. Perhaps the most salient challenge is the understanding and communicating (teaching) of a work ethic suitable for the workplace of this new age.

INTRODUCTION

The Internet so commonly used today, began as the ARPANET during the cold war in 1969. It was developed by the U.S. Department of Defense's in conjunction with a number of military contractors and universities to explore the possibility of a communication network that could survive a nuclear attack. It continued simply because the DOD, it's contractors, and the universities found that it provided a very convenient way to communicate. (The Internet Economy Indicators,2000).

Today few would argue that the Internet is changing every aspect of our lives, how we work, live, play and learn. In fact, the Internet is emerging as a major force behind the strongest U.S. economy in history. A recent study by the University of Texas showed that the Internet economy grew to $523.9 billion in 1999, and now directly supports nearly 2.5 million workers, more than the insurance, communications and public utilities industries. Internet economy companies grew at an annual rate of 11 percent from 1998 to 1999, nearly three times the growth rate of the economy as a whole for the same period. The Internet economy is impacting businesses and governments on a global scale. Business leaders recognize the strategic role that the Internet plays in their company's ability to survive and compete into the next century.

Government leaders world wide, increasingly understand that the Internet will shape the future of their economic welfare and the welfare of their citizens. The Internet is driving a global economy that is creating unprecedented opportunities for countries, companies and individuals around the world. This past year, 17 Million US households were shopping online, with online retail sales expected to top USD $20.2 billion, and 56 percent of U.S. companies will sell their products online by 2000, up from 24 percent in 1998 (NUA/Forrester Research, 2000). Mediamark Research Inc. has released data which suggests that there are 64.2 million adults going online in the U.S. every month. (NUA,2000). The NEC Research Institute reports that there are currently 800 million pages on the web. A survey of 30,000 consumers in 30 nations found that the U.S. not only has the fastest-growing number of Internet users, but the largest proportion of e-commerce consumers. (Roper Starch Worldwide, 2000).

More than a million new jobs were created by the U.S. high-tech industry since 1993. (American Electronics Association) and this summer 82 percent of college graduates will search for careers and employment information online (NUA, 2000). Preliminary employment data show that the U.S. high-tech industry employed 4.8 million workers in 1998, making it one of the nation's largest industries (U.S. Bureau of Labor Statistics, 1999). Information technology sectors are growing at double the rate of the overall economy and have jumped as a share of the economy from 6.4% in 1993 to 8.2% in 1998. High-tech has driven more than a quarter of all economic growth since 1993. In 1965, high-tech's share of business spending was 3%. In 1996, it was 45%. In 1996, 7.4 million people worked in high-tech jobs, earning an average salary of $46,000, more than fifty percent more than the average wage of $28,000. (U.S. Department of Commerce, 1999).

Internet Usage WorldWide

In North America and Europe, 1 in 6 people use the Internet. (NUA, 2000). The number of women using the Internet worldwide will pass 96 million, or 45 percent of the world's Internet users in 2001. (Computer Economics, 2000). In 1993, there were 26,000 domain names in use. In 1999, there are 5 million web sites. (U.S. Department of Commerce/Netcraft, 2000). In 1993, 3 million people were connected to the Internet. In 1999, 80 million Americans are connected and approximately 200 million people worldwide. (U.S. Department of Commerce, 1999). 364 million PCs were in use in 1998. (Computer Almanac Industry, 2000). Today, over 50% of the online community originates from outside the US. (IDC, 2000). By 2005, non-US Web users are forecast to comprise 700 million of the total one billion users. (NUA, 2000).

The global e-commerce market is expected to reach $1.2 trillion by 2001. (Global Sight Corporation, 2000). In India, there is an immediate demand for 500,000 additional Internet connections and in Europe, 47 million households are expected to have Internet access by 2003. There will be over 24.3 million Internet users in Latin America by 2003. (NUA, 2000)

Changes in Vocational Teacher Preparation: During the past twenty years America entered the "post-Fordist" economy. This change in economic conditions created a blurring of traditional distinctions between mental and manual occupations and between academic and vocational education (Sharp, 1996). Sharp asserts that vocational teacher education must be changed so future teachers can develop a new core work force with the technical and interpersonal skills (work ethic) required for a less hierarchical workplace. Gregson (1993) supports this thought and contends that vocational teacher educators must learn to produce teachers capable of transforming their students into the critical thinkers and problem solvers needed to make workplaces more democratic and emancipatory. Miller (1996) claims the mission of vocational education (and thus vocational teacher education) should be based on the principles of constructivism. The cognitive approach should emphasize "constructing" knowledge through a problem-solving process designed to produce "learners who are problem solvers, lifelong learners, makers of meaning, collaborators, change agents who are also able to change, and practitioners of democratic processes"(p. 69).

Over 25 concepts/measures of worker commitment (work ethic) have been generated by researchers since 1956 (Morrow, 1983), some of these measures are: (1) the protestant work ethic (the belief that hard work is intrinsically good and an end in itself; Mirels and Garrett, 1971); (2) career salience (the importance of work and a career in one's total life; Greenhaus, 1971; (3) job involvement (the degree of daily absorption an individual experiences in work activity; Lodahl and Kejner, 1965); (4) work as a central life interest (an individual's preferred locale for carrying out activities; Dubin, 1956); Taveggia and Ziemba, 1978); and (5) organizational commitment (the extent to which an employee desires to remain in an organization, exerts effort on its behalf, and believes in an accepts the organization's values and goals (Mowday, Porter, & Steers, 1979

Lankard (1995) citing the work of others states that Generation X, the population cohort following the Baby Boomers, do not have a poor work ethic - they just view the concept of career differently. A Swedish study on the work attitudes of young people supported this finding. Young people possess internal or postmaterialistic values in addition to more traditional values associated with work. Girls ranked higher on intrinsic work goals than economic ones (Hagstrom & Gamberale, 1995). Many studies on work attitudes or values of young people cite degrees of dissatisfaction with their "work attitude" (Capelli & Iannozzi, 1995). The perception that there is a problem with the work ethic of younger workers, and that more effort should be made to teach work values was found to be held by employers (Florida State Department of Education, 1991; Donsky, A., & Others (1994); Ford & Herren, 1993; Cappelli & Iannozzi, 1995), teachers (Gregson & Bettis, 1991), parents and principals (National PTA, 1992), and government (Nierdergang, 1992; National Council on Vocational Education, 1991). A review of the literature revealed the greatest effort being made to teach work values is being undertaken by vocational education.

Teaching Work Ethic: Regarding the teaching of work ethic values, Ford & Herren (1995) in a survey of 160 work program coordinators in Georgia, found that coordinators felt that the teaching of work ethics in their classrooms was largely informal or unintentional. Cherrington (1980), in discussing the teaching of work ethics values, stated that indoctrinational strategies are commonly used. However, Gregson & Bettis (1991) through a series of interviews with trade and industrial instructors across Virginia, did not find evidence to support the contention that vocational instructors use primarily indoctrinational strategies to teach work values and attitudes. Although reward structure and role modeling were used extensively, more democratic strategies, such a group discussion, on-on-one counseling, and role-playing were also frequently used.

International Work Ethic: Two studies were found which investigated differences of culture among countries regarding work ethic values. Another study sought commonalties. One study examined country group differences in economic beliefs and attitudes (Furnham, Kirkcaldy, and Lynn, 1994). Nearly 12,000 students from 41 countries completed questionnaires measuring 7 traits: work ethic, achievement motivation, mastery, competitiveness, and achievement through conformity, money beliefs, and attitudes to saving. The authors found that countries from North and South America scored highest on work ethic and mastery while young people in Far and Middle Eastern countries reported the highest competitiveness and acquisitiveness for money. Another study specifically measured and compared Protestant Work Ethic scores in13 countries, utilizing 7 work ethic scales with varying reliabilities and validities (Furnham, Bond, Heaven, and Hilton, 1993). There was a highly significant difference between the scale scores of the subjects from the different countries, and the differences tended to be consistent for the disparate measures. Subjects from richer, First World countries tended to have lower scores than those from Third World countries. Also, the authors discovered a significant correlation between the most well known work ethic scale score and G. Hofstede's power-distance score, indicating that work ethic belief is associated with the amount of weight that is placed on prestige, power, and wealth in a society. Giorgi and Marsh (1990) reanalyzed data from a 1981 European values survey to (a) determine the existence of a consensual work ethic among modern industrial societies and, (b) examine the link between work ethic and religion. France, Italy, West Germany, the United Kingdom, Holland, Belgium, Denmark, and Spain comprised the country groups. These Western European cultures appeared to embrace similar values associated with work. Specifically, the authors discovered what they called a "vocational work ethic", which stresses the rewards of self-fulfillment and social obligation. This ethic, in turn, was linked with religious denomination and degree of religious fervor. Also, people who had more education had higher work ethic values.

Among the more recent instruments are Ray's (1982) Eclectic Protestant Ethic, Ho's (1984) Australian Work Ethic; Wayne's (1984) Protestant Ethic and Contemporary Work Values; and Petty's (1990) Occupational Work Ethic Inventory. The value and definition of what is generically called the work ethic has undergone a transformation from the foundations of the concept as it was originally conceived and applied during the agrarian and industrial periods of history. These instruments were developed in order to better match the conditions of the modern workplace and the exigencies of the modern worker in the information age.

Petty's Occupational Work Ethic Inventory (OWEI)

Petty's Occupational Work Ethic Inventory was developed and tested by Petty (1991a). As it is normally used, the OWEI instrument consists of three segments. The first segment introduces the instrument, provides instructions for the participant, and assures confidentiality. The second segment represents the scale of 50 items. And the third segment is generally attached in order to gather demographic information from the respondents. The **Occupational Work Ethic** is defined by Petty as: *the displayed behavioral characteristics (work habits, attitudes, and values) based on an individual's personal values and mores while working for income within a paid occupation (versus sports, religious activities, hobbies and other avocations).*

Petty's OWEI is based in part on the original work of Dr. H. C. Kazanas at the University of Missouri in 1977-1978. Dr. Kazanas' (1978) empirical investigation was related to affective work competencies and work values, with an emphasis on how to measure them. Utilizing the affective work competencies phrase list extracted from a population of workers, supervisors, and vocational educators (Petty & Morgan, 1980), Petty then set out in 1990 to develop a new instrument which could use these terms to measure work ethic characteristics directly related to a person's work. A panel of subject-matter experts was used to establish content validity through a form of semantic analysis, which entailed the categorization of simple one or two word descriptors into groups. Independent categorization and re-categorization took place until a consensus was reached (Petty, 1991a). The resulting clusters were labeled Dependable, Ambitious, Considerate, and Cooperative. A 1995 study by Petty gave four clusters: interpersonal skills, initiative, being dependable, and reversed items. An anchor or stem phrase of "At work, I can describe myself as:" was added to direct the participant to their responses. A Likert-type scale was provided for rating participant standards for each item: 1 = Never; 2 = Almost Never; 3 = Seldom; 4 = Sometimes; 5 = Usually; 6 = Almost Always; and 7 = Always. A pilot study was undertaken later in the year. A coefficient alpha estimate of internal consistency was computed to be .95 (Petty, 1991b). As a result of this pilot analysis, all 50 of the OWEI items were left intact. A pilot study by Hill (1993) of 135 college students and staff employed in a small four-year liberal arts college was conducted in order to check the internal validity of the OWEI instrument. A computed coefficient alpha was .94.

Since 1990, numerous studies have been undertaken in order to measure work ethic attitudes using the OWEI, or investigate issues related to the instrument's validity. The following discussion focuses on issues pertaining to the validity of the instrument; a separate section will discuss research findings related to work ethic research in which the OWEI has been utilized. One of the first studies to utilize the OWEI instrument was undertaken by Hill (1993). The purpose of the study was to determine if there were significant differences in the work ethic of workers categorized by Standard Occupational Classification (SOC), level of education, age, gender, years of full-time work experience, or empowerment. This study was unique in that it utilized respondents from randomly selected workplaces, covering a wide range of occupations, instead of the more commonly seen convenience samples. A multivariate analysis of variance procedure revealed significant differences in work ethic for all of the above groupings. Further analysis using a Fisher's protected LSD procedure was employed in order to determine precise differences for each of the independent variables. Differences for the four dimensions of the work ethic represented by the subscales of the OWEI were found for SOC, education, gender, work experience, and empowerment. The OWEI was found to be internally consistent and highly reliable, based on a computed coefficient alpha of .95.

A factor analysis was performed by Hill and Petty (1995) in order to identify key themes, which characterize the occupational work ethic and further refine the Occupational Work Ethic Inventory (OWEI). A principle-components analysis was performed; using squared multiple correlations yielded 4 factors, which met the Kaiser's criterion. A scree test was performed, and rendered a four-factor solution. Finally, orthogonal rotation using the Varimax procedure was employed, in order to minimize the number of loadings on a factor, which enabled the researcher to more easily interpret the resulting list of constructs produced via the factor matrix procedure.

The labeled factors were: **Interpersonal Skills** - comprised items which related to working relationships with other people and the general concept of cooperation; **Initiative** - incorporated items which dealt with the idea of ambition, "moving up the ladder", and adherence to a difficult job situation; **Being Dependable** - included items which had to do with fulfilling the (minimum) expectations of the employer for satisfactory job performance, including such things as punctuality and honesty; and lastly, **Reversed Items on the instrument** - This factor was made up items which were reversed and stated in the negative on the OWEI in order prevent participants from developing an unacceptable response pattern.

Research Studies Utilizing the Occupational Work Ethic Inventory

Hill (1993) undertook a study to determine if there were significant differences in the work ethic of workers categorized by Standard Occupational Classification (SOC), level of education, age, gender, years of full-time work experience, or empowerment. Among the more easily interpreted findings were those related to the level of education and gender groupings. The mean subscale scores of workers grouped by level of education increased sequentially for the subscale of *ambitious*. Significant differences were not found for the subscales of *dependable*, *considerate*, or *cooperative*. Level of education was partitioned as follows: group 1 - less than a high school diploma; group 2 - high school degree or GED; group 3 - two years of college or Associate's degree; group 4 - Bachelor's degree; group 5 - some graduate work. Females scored significantly higher than males on all four of OWEI subscales. Mixed findings for the variables of full-time work experience and empowerment do not appear to lend themselves to useful interpretation.

A study by Hatcher (1994) examined the work ethic of apprentices and instructors in a trade union apprenticeship-training program. The study revealed that there was a significant difference in work ethic for participants in the categories of occupation and job specialization. The author suggested that these differences might be due to the maturity of older instructors, more humanistic characteristics of younger apprentices, and the definitions of job specializations. A study by Petty & Hill (1994) explored the occupational work ethic of women and men. Women tended to be more heavily concentrated in occupations classified as technical, clerical, or sales and men were more evenly distributed across the SOC aggregate groups. The calculated results revealed that females scored higher than males for every subscale (i.e. dependable, ambitious, considerate, and cooperative).

Petty and Hill (1994) stated that women exhibited a stronger work ethic than men did, which is consistent with findings of other researchers (Hall, 1990, 1991; Hill, 1993; Miller, 1980; Wayne, 1989). The research of Lyson (1984) and Miller (1980) was cited as evidence that women have different expectations from work. The importance of stressing these affective factors in the areas of teaching and vocational guidance, and especially the idea of helping students assimilate these factors are provided as important implications for this study.

A study by Hollingsworth (1995) examined the roles, together and separately, of leadership orientation and work ethic. It was discovered that the participant home economists emphasized the factors of (a) Dependability and (b) Interpersonal Skill, with the third factor of (c) Initiative being clearly distinguished as being the least important.

Petty published three studies in 1995 (1995a; 1995c; 1995d) that apparently used the same population/sample, but which focused on disparate demographics. The population for these studies consisted of workers from the mid-south region of the United States. From a master list of businesses and industries in the community, a sample of approximately 3600 possible participants was developed, utilizing a random block design, which included 200 industries. There were 2,232 observations used in the analysis due to no returns or missing values. The instrument used to gather data, the statistics used to analyze the data, and other incidentals of research were essentially the same as those used in the Petty & Hill (1994) study discussed earlier.

Through an examination of job titles, which comprised the sample, Petty (1995d), made the observation that the six SOC classification groupings roughly correspond to generally known teaching areas in industrial-technical teacher education. For the persons represented by this data set, the analysis reveals that self-rated work ethic does differ by occupation. Each teaching area group appeared to rate one or more of the dimensions of occupational work ethic as being more important; no one teaching group (SOC aggregate group) stressed all four dimensions equally. The primary implications of this study were stated to be the importance of teaching the proper attitudes that attend each occupational area, and the need for vocational guidance of students, that is, to better match student behaviors and attitudes with suitable occupational areas.

SUMMARY

A high-spirited work ethic is consistent with entrepreneurial success. The new international economy (complemented with the information age, the Internet, e-commerce, e-communication, and e learning) will require understanding and communicating (teaching) of a work ethic suitable for the workplace. The way businesses and workers interact, communicate and problem solve are creating new challenges for vocational educators and trainers worldwide. These new challenges have greatly altered our traditional knowledge of the world of work and our ability to teach the work ethic. This important ingredient to economic success must be further investigated and explored to develop better techniques for preparing tomorrow's workforce.

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TELE-OPERATION OF A MANUFACTURING SYSTEM FOR VOCATIONAL EDUCATION

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Hong Kong Institute of Vocational Education (Chai Wan)

Index: Distance and open learning, Education on demand

Abstract: A flexible manufacturing system was designed and developed to become a decentralised modular network manufacturing plant in the Hong Kong Institute of Vocational Education (Chai Wan). The system consists of a flexible machining cell, flexible assembly cell, automatic storage system, a database server, web-server and video conferencing system which are to be linked by various networks internationally with other educational institutions or manufacturing sites.

Various areas for the development such as system layout, simulation, mechanical design, hardware and software development have been carried out. The current development is to establish a web-based control and training system to the customers or students. They can view the operation of manufacturing and assembly processes as well as access system data and information globally.

The aim of this paper is to report the tele-control development of the flexible manufacturing system. The development changes the current education process. The system provides virtual and animated images on design, manufacturing attributes and supports remote training. Students, at a distant location can acquire skills, production methods and access system data and information globally. Moreover, instant feedback from students is possible, as they can make criticism at any geographical area. Delivery of knowledge can now be on-line and in real time globally to achieve better result of education.

Students using this system can communicate with the system host using Internet or ISDN leased line directly. They can submit task on various manufacturing processes and control of industrial robots through Internet or intranet. Host's feedback to students is also provided in order to enhance the learning process.

INTRODUCTION

A Flexible Manufacturing System (FMS) [1,2] has been designed and developed in the department of manufacturing engineering, Hong Kong Institute of Vocational Education (Chai Wan) to become a decentralised virtual modular network manufacturing plant named as Tele-presence Depot (TPD). A database is designed for the TPD to be linked by Internet network with other production depots and this is called International Network (IN). This leads to the International Network Corporation (INC) enabling globalisation of manufacturing activities at any geographical location to be integrated into one system. Individual TPDs can then be integrated together to become a global partner of the multi-national corporation. Globalisation in the context of INC means that the product or different part of the product can be designed, tested, analysed, and manufactured in different TPD at different sites worldwide for a number of reasons, such as technology and resources available in a particular TPD.

An INC may have various design experts, machines and equipment located around the world. Appropriate decision has to be taken to allocate different tasks to a suitable TPD in order to maximise the utilisation of resources. In order to manage all these facilities effectively and to handle its policy making and production planning, an INC needs a communication network that interconnect its multiple manufacturing plants and sales offices as well as other facilities. Considering this, an attempt has been made to design and develop IN making use of the advanced technology in Internet and multimedia.

Effective productivity depends on time to market, product costs, market share, and quality. The IN is a systematic tool that embraces customers, suppliers; distributors, powerful information infrastructure, and effective use of modern technology leading to every success of a INC.

Globalisation of manufacturing requires efficient transfer of manufacturing information among various regions. Therefore, a technique called Telepresence Teaching and Learning (TPTL) is designed and implemented to change the current education process. Individual TPD in one part of the world can control off shore manufacturing and at the same time viewing the animated manufacturing processes on line via the IN.

This is like making products in house without going to the distance site. Similarly, students in one location will be able to control the FMS and even the robot located remotely as well as enjoying the animated presentation. The system provides web site as an interface between students and the TPD incorporated with central network server and allows students at a distant site to operate the machines through Internet.

LITERATURE REVIEW

Video conferencing is the combination of dedicated audio, and communications networking technology for real time interaction [3]. Types of video conferencing include room based systems and desk top video conferencing. Room based systems allow groups of people in a room setting to communicate with other groups of people. Desktop video conferencing combines personal computing with audio, video, and communications technologies to provide real-time interaction from a typical personal computer, and the interaction embodies communications between groups of people.

In education, numerous researchers [4,5,6,7] have evaluated video conferencing system (VCS) to be effective and efficient as means of imparting instruction and information to geographically dispersed groups of people. It allows students to enhance interaction at distant site. Using the system for educational delivery was found to be flexible and exchange of ideas and knowledge is greatly improved and learning experience is substantially enhanced.

Coventry [8] reported that video conferencing has great potential for learning in higher education. The potential lies in creating greater opportunity for dialogue which facilitates more effective learning than working in isolation. Dialogue may be between tutors and learners or amongst learners.

In view of the development of Internet, applications of VCS are associated with the education in Internet environment. West Virginia Educational Network [9] was created to link up classes for higher education. Perrone [10] presents WebQuest, which is a system combining the WWW with the notion of an interactive quest game. Players of the game answer questions to acquire important objects needed to solve the quest.

Wong et al. [11] used the concept of dynamic documents to render on a WWW browser, a sequence of multimedia scenarios, having objects of types such as audio, image, plain text, HTML, document and animation. It allowed the user to interactively test and compose such a presentation, using Netscape Navigator to collect multimedia resources from the WWW. A presentation database stores the presentation and serves as a convenient repository for users to access.

The current Internet is widely accepted by users for communication world-wide. The Global Internet is now being used to manage networks as well as user and application interaction in a local and international environment. The video must be integrated with the Internet/Intranet and organised to enhance information processes such as, email services,

SET-UP OF THE TELE-OPERATION MANUFACTURING SYSTEM LABORATORY (TMSL)

The configuration of the tele-operation manufacturing system is shown in Fig. 1. The main components in this system include a web server and a database server in the host computer. The web pages in the web-sever provide an interactive interfaces to the users. The web-pages allows users to select various combination of product design, orders for product and animated images on product design. In addition, the users can view the operation of manufacturing processes and make dialogue with the local site through internet or VC system. The later features are useful for vocational training globally.

The web-pages are front-end database application, which allow users to select and submit their requests into the host computer. In the host computer, which includes a SQL database server, whenever there is a request being submitted through the Internet or Intranet, the data will be transmitted into the SQL database server and stored up automatically. A visual basic control program run on a local computer will communicate to the host computer. The local computer connects to an ABB robot controller through a robcomm software. The robcomm software is a TCP/IP communication software which set up the communication between the ABB robot and the local computer. The entire manufacturing system can be controlled and monitored by an external computer via this TCP/IP communication interface.

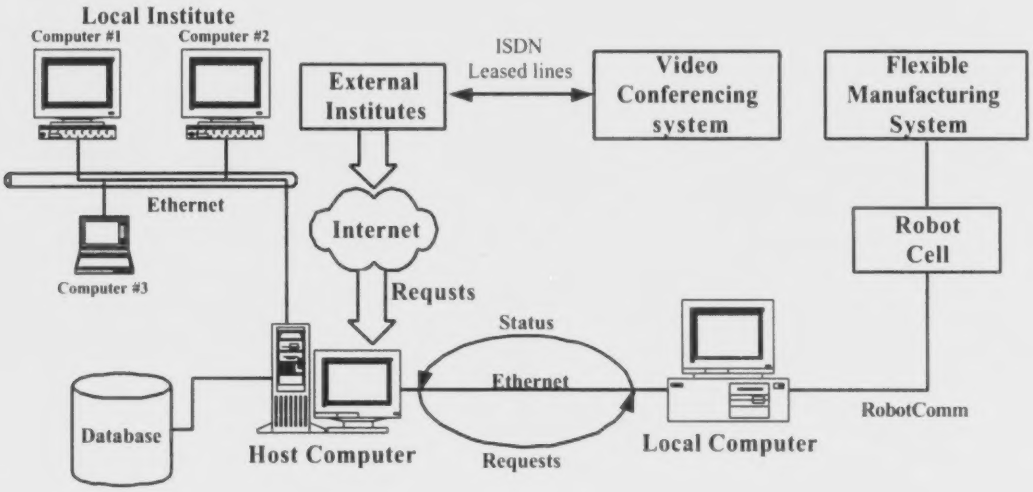
Local Institute
Computer #1
Computer #2
Ethernet
Computer #3
External Institutes
ISDN Leased lines
Video Conferencing system
Flexible Manufacturing System
Robot Cell
Internet
Requsts
Status
Ethernet
Requests
Database
Host Computer
Local Computer
RobotComm

Fig.1 Tele-operation Manufacturing System

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In addition to the control aspects, the tele-operation system also includes a monitoring system. The monitoring system is divided into two parts. The first part installs a number of web cameras to monitor the operation of the manufacturing system. The local computer can communicate with other computer via Internet or intranet using Microsoft Netmeeting. With this setting, the local computer can make a call with a remote computer and communication can be established. Both video, audio, file transfer and software sharing activities can be made. Due to band width of the existing network, this configuration performs satisfactory only in the host institute within the local area network (LAN). However, it can still provide an useful on-line training to our students. For example, staff in classrooms or laboratories can link to the TMSL for on line demonstration and discussion via the campus network.

In order to speed up the communication, a video conferencing system with three 128k ISDN leased lines is adopted to improve the speed of video and audio images. External institutes can make a call to the VC system so that they can communicate with the lecturing staff in the laboratory. With this set up, the frame rate can be up to 30 frames/second which is acceptable quality for audio-visual images.

The tele-operation manufacturing system laboratory (TMSL) uses the video conferencing system (VCS) that facilitates collaboration, interaction and information interchange among various systems. It also permits virtual meeting with voice, graphic text, and video capabilities. It is a powerful tool for effective dissemination of knowledge globally.

Students can gain experience as a result of attending the training using VC system via TMSL as well as through monitoring other depot's manufacturing processes. They can have a better insight for improving productivity with international collaboration. They can understand how multi-disciplinary teams and resources located worldwide could be managed as well as data can be shared amongst teams from different domain.

TMSL not only offers the ability to integrate audio experience directly with text, but also adds the power of interactivity. This learning system generates an active, and self-directed learning environment for students. The system not only improves the process of teaching and learning, but also provides new tools and technology that promote remote learning.

CONCLUSION

An engineer on one side of the world will be able to control the FMS and the robot cell located remotely. He can work on a common manufacturing activity with another remote engineer collaboratively and interactively through the implemented development. Geographical barriers that defer the operations of International Network Corporation (INC) will be eliminated. With the installation of video conferencing system, photo-realistic images can be produced which provides a convincing audio and visual presentation for design selection, manufacturing and assembly processes. People can view all these virtual and animated display worldwide.

The use of telepresence teaching and learning (TPTL) improves quality of teaching by delivering knowledge globally to students. Students, at a distant site, can acquire skills and production methods on a PC and concurrently access necessary data and information (Support remote training and on line operation training to students). Students can overcome the barriers of time, distance, and costs to share information and knowledge on line as well as in real time to achieve the best value from education. Instant instructional feedback is possible, as students are able to make global criticism at any geographical location.

Use of TPTL may result in less teaching manpower and teachers can use more time to carry out research or to receiving life long training to keep abreast of latest technology.

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WORLDWIDE TECHNOLOGY TREND OF ELECTRONICS PRODUCTS

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Hong Kong Productivity Council

Abstract: Electronics products have undergone much significant advancement in recent years. Although the development trends have primarily been determined by the developed nations such as United States, Japan and the European countries, these trends have been largely driven by many principal drivers. These principal drivers can broadly be classified in terms of users, technologies and regulatory changes. This paper briefly examines these drivers as well as the technology and product trends in the sectors of telecommunications, consumer electronics and information technology products. Its implication to the training and skill development requirements for Hong Kong will also be examined.

DRIVERS FOR CHANGES

Many new types of electronics products have emerged in the past few years offering innovative features that are made possible by recent advances in new digital technologies. In order to understand the way that new electronics products have evolved and developed in the past few years, it is prudent to examine the principal drivers for these changes. These principal drivers can broadly be classified in terms of users, technologies and regulatory changes. The changes in user requirements and behaviour have led to the development of many new technologies that in turn create new markets. Regulation changes, such as the introduction of stringent rules, or deregulation, can lead to incentives to develop new technologies or emergence of new products, or both.

In terms of new technologies, it can be broadly divided into five fundamental technology drivers:

1. The continuation of processing power increase following Moore's law
2. Increasing emphasis of Intellectual Property on silicon
3. Transmission technology in speed and connectivity
4. Storage technology in solid states and magnetic media
5. Electronics packaging technology in miniature products

These fundamental technology drivers will continue to dictate the development and trend of the electronics product in the future and by understanding these technology drivers one could better prepare for the technology trend in the coming years.

As a result of these principal drivers, the innovative electronics products are continuing to emerge heading for the following directions:

1. Digitalisation
2. Convergence
3. Connectivity
4. Miniaturisation
5. Standardisation

These directions are the attributes of new electronics particularly for a connected society. The pace of the development of these products in different countries will be determined largely by the pace at which the information infrastructure is established. Currently, Internet provides a means by which individuals can make use of innovative electronics products to work more efficiently, to be entertained, to communicate better, and to conduct their day to day personal business.

TECHNOLOGY AND PRODUCT TRENDS

Telecommunications Sector

This sector will play a major role in enabling the connected society to be more closely connected. The key areas for development in this sector in the next few years will be in wireless data communications and home applications. Figure 1 shows the major product trend of the telecommunications sector for a number of major product types. The general direction of these product trends are in enabling users to get connected to the Internet while they are on the move, in the office or at home. Some of these products are the result of convergence of the sectors of Information Technology and Telecommunications. Internet Appliances are the prime examples of this type of products.

With the looming introduction of GPRS (General Packet Radio Service), EDGE (Enhanced Data Rate for Global Evolution) and 3G (Third Generation Mobile Phone) over the next three years, users will be able to be continuously connected to the Internet while they are out of their office. With the packet based GPRS, to be available in Hong Kong in the later half of 2000, users will be able to be connected to the Internet continuously without the need to pay the hefty fee as with the current circuit switched GSM data services. The GSM service is currently charging on the time use

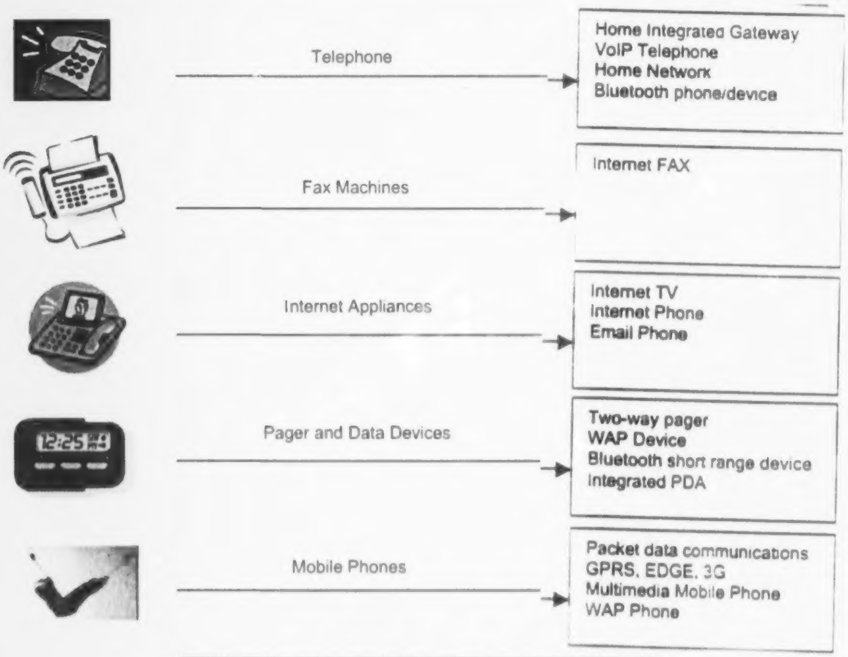
Telephone
Home Integrated Gateway
VoIP Telephone
Home Network
Bluetooth phone/device
Fax Machines
Internet FAX
Internet Appliances
Internet TV
Internet Phone
Email Phone
12:25
Pager and Data Devices
Two-way pager
WAP Device
Bluetooth short range device
Integrated PDA
Mobile Phones
Packet data communications
GPRS, EDGE, 3G
Multimedia Mobile Phone
WAP Phone

Figure 1: Product Trend of the Telecommunications Sector

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during the entire connection session while GPRS only charges for the bandwidth used in the transmission of data, regardless of the connection time. While GPRS will eventually increase the current connection speed from 9.6 Kbps to 114 Kbps, EDGE technology, to be available in 2001, will push the transmission speed up to 384 Kbps. With the likely increase in user demands on the bandwidth, 3G will offer broad band wireless communications of up to 2 Mbps. Products which are 3G capable are expected to come on to the market in 2002.

On the other hand, Bluetooth will not only bring wireless network connection to the office but also to the home as well. The low cost expected of Bluetooth components will allow many household products to be, "Bluetooth enabled". While inside the home, a home network can be realised by a Bluetooth network, the connection out of the home will also expect to undergo a fundamental change. Home gateway will play a major role. The connection out of normal home will gradually migrate from a normal telephone circuit switched connection to a packet switched data connection. Then, voice, data, Internet, cable TV, Interactive TV and fax lines will all be integrated into one single connection to possible the "Next Generation Network (NGN)" which is expected to replace the current giant telephone exchange networks.

The mobile phone will play a more important role in the connected society than a mere voice-based device. Already, there is the first version of WAP phones on the market which is only the first of this type of mobile phone based data terminal devices in the market. With the increase in available bandwidth with the new GPRS, 3G type technology, mobile phones will have multimedia features allowing not only voice but also video and other types of data to be communicated.

Consumer Electronics Sector

Digitalisation has been a major technology trend of consumer electronics for the past years and it is going to be a prevailing trend for the years to come. Figure 2 shows the major product trend of the consumer electronics sector for a number of major product types. Digitalisation allows more functionality and processing to be performed in the data. For example in video recording, products, such as DVD (Digital Video Disk) players, play back many hours of video in a single disk through the use of compression technology. The compression and decompression technology requires the use of specialised digital signal processor chip to perform the necessary operations. As noted in previous section, intellectual property on-a-silicon is one of the main technology driver for this trend. With the continuous increase in the processing power of DSP and ASIC (Moore's law), more versatile and computational intensive features can be implemented. Many types of consumer products are no longer standalone products. The increase in processing power of the ASIC and processor allows these products to have built in functions to connect to the Internet.

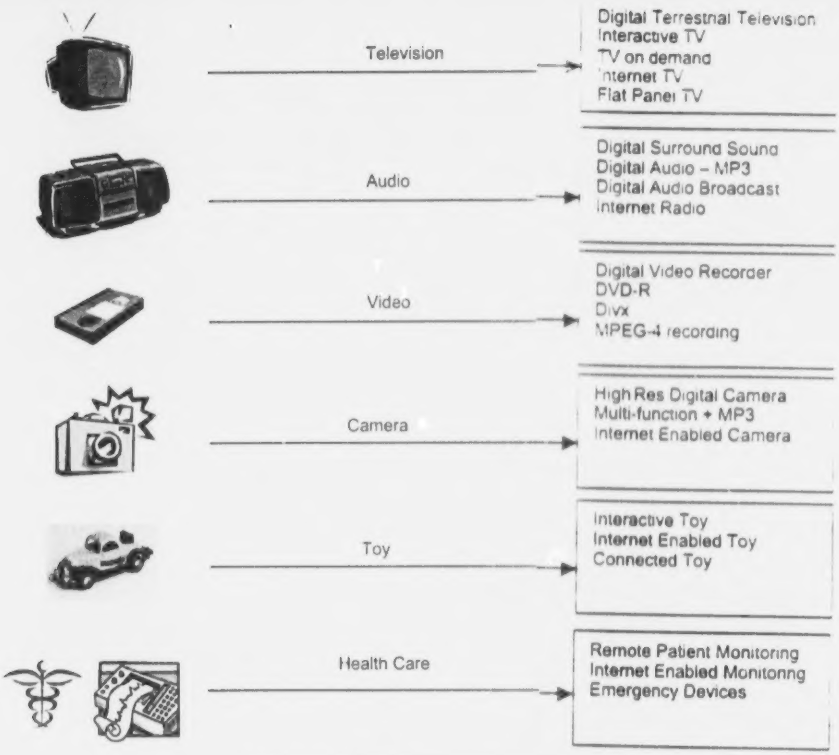
Television
Digital Terrestrial Television
Interactive TV
TV on demand
Internet TV
Flat Panel TV
Audio
Digital Surround Sound
Digital Audio – MP3
Digital Audio Broadcast
Internet Radio
Video
Digital Video Recorder
DVD-R
Divx
MPEG-4 recording
Camera
High Res Digital Camera
Multi-function + MP3
Internet Enabled Camera
Toy
Interactive Toy
Internet Enabled Toy
Connected Toy
Health Care
Remote Patient Monitoring
Internet Enabled Monitoring
Emergency Devices

Figure 2: Product Trend of the Consumer Electronics Sector

Indeed, connectivity to the Internet is another major technology trend of new types of consumer electronics products. Products such as digital still camera, MP3 players, electronics toy and games, radios and televisions all have their Internet enabled versions. Digital still cameras will have built in TCP/IP stack and modems such that it is able to dial up to the Internet and upload or email certainly pictures to a destination email address. MP3 players now longer will require the PC to download songs while they will have their own WEB browser built-in such that it is able to download songs from the Internet. Already, there are many video games that would make use of the Internet to achieve multi-player operations. ReplayTV and TiVo provide the service in the United States making use of the Internet to regularly update television-programming information and provide the user with a customised on-screen channel guide to make recording of video programs a one-touch operation.

Some products that emerge in recent years are the results of the convergence of the traditional sectors of Consumer Electronics, Information Technology and Telecommunications. For these products, with most of them with the ability to be connected to the Internet, they can no longer be clearly classified into either of the three traditional sectors. In effect, the growing trend is that the barriers between these traditional sectors are breaking down and many new products are expected to emerge. Some classify these products as convergence products.

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Information Technology Product Sector

The following adjectives will best describe the product trends of this sector: cheaper, faster, feature packed, connected, broad bandwidth, portable and flat. Figure 3 shows the major product trend of the information technology sector for a number of major product types.

Connectivity to the Internet is the essential product and technology trends of the information technology product sector. With the ever increasing use of the Internet, the demands on LAN and connection to the Internet in turn become a key driver for the growth in this industry. For local area network, the technology trend will head for two separate directions. For heavy traffic LAN, gigabyte or even ten-gigabyte networks will couple with optical fibres connected directly to the computer. The higher transmission speed will imply heavier reliance on optical communications and the proliferation of optical electronics closer to the client end. For most types of LAN, cable replacement Bluetooth technology will be the prevailing trend of wireless LAN. With the initial bandwidth of 1 Mbps and low component cost, Bluetooth technology offers integrated services allowing wireless transmission of both voice and data within the office.

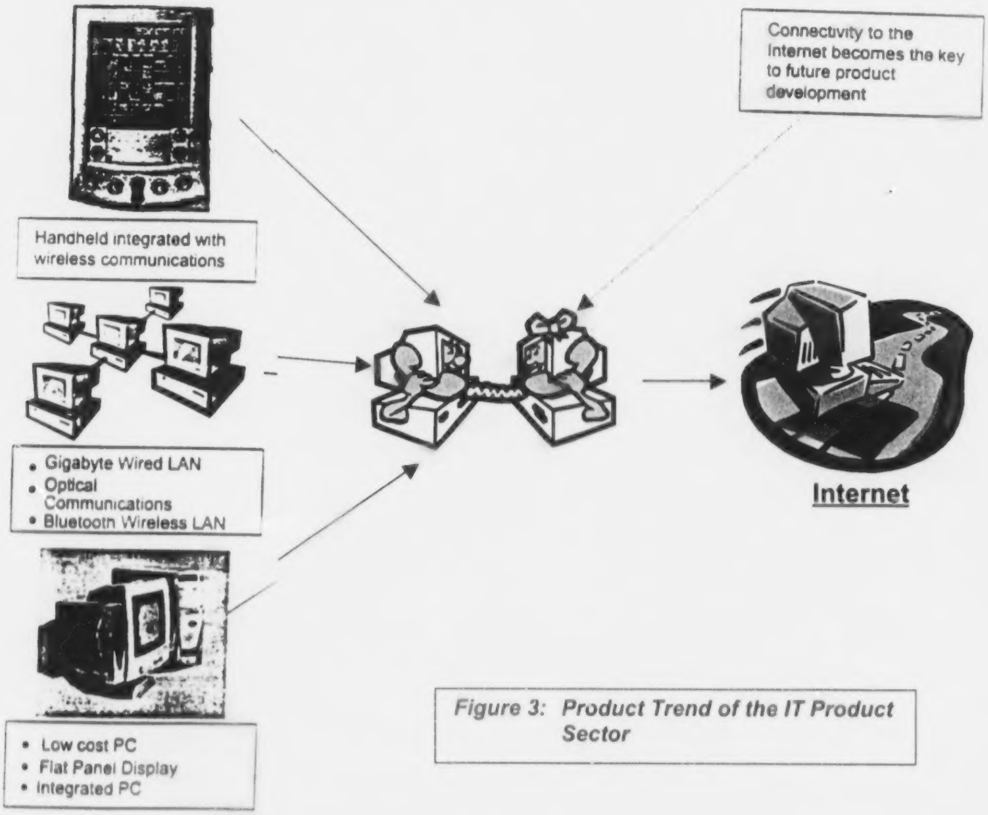
Connectivity to the Internet becomes the key to future product development
Handheld integrated with wireless communications
• Gigabyte Wired LAN
• Optical Communications
• Bluetooth Wireless LAN
Internet
• Low cost PC
• Flat Panel Display
• Integrated PC

Figure 3: Product Trend of the IT Product Sector

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Mobile Computing technology will see significant development in coming years. Wireless data transmission technologies such as GPRS, EDGE and the looming 3G allow handheld computers to be continuously connected. As with the way mobile phones have fundamentally changed the way users communicated by telephones, continuously connected handheld computers will allow users access to the important data in the office. The product trend is this area will be that handheld computer will have built-in wireless data transmission capabilities. First version of this type of handheld units is now available from major vendors such as Palm, Nokia, Ericsson and Motorola. Although many view these first attempts to be too clumsy, vendors will eventually perfect these units through more powerful processors and better packaging technologies.

THE IMPLICATION OF THESE ADVANCES

The five technology directions noted in the first section of this report: Digitalisation, Connectivity, Convergence, Miniaturisation and Standardisation will form the basis for electronics products developed in the next few years with the first two being the major technology trends.

Digitalisation will demand for more powerful processors and versatile algorithms in the development of new products. These new algorithms or intellectual properties will be implemented in the form of ASSP or ASIC where most of the value add of a new product will lie. In the new economy, countries or regions that are able to develop and produce the IP, and subsequently the ASIC, will gain the most from the development of new products. Connectivity to the Internet poises to be the major trend across all three sectors. Following MetCalfe's law, the demand on the network utilisation will increase exponentially with the number of connected parties. The demand on products directly or indirectly related to Internet connectivity will increase significantly. Convergence of traditional sectors of information technology, telecommunications and consumer products will create opportunities for new product ideas.

With these trends being the main focus for technology and product development in the next few years, the implication for Hong Kong can be summarised in two major factors: human resources training and infra-structural support.

With the stronger emphasis on IP development and its implementation as ASIC or ASSP, Hong Kong as yet do not have sufficient infra-structural support in terms of their design and fabrication. Most electronics manufacturers in Hong Kong are system integrators with most major components such as processors, display and memory chips imported from overseas. The fact that Hong Kong manufacturers are merely doing OEM or ODM points to a danger that Hong Kong will lack behind in the new economy where IP is the main treasure. Complex IP (intellectual property) in algorithms and product functions is developed as full custom ASICs and/or firmware into silicon chips. IP on silicon has become the highest value added components in a product, thus allowing the originator to command the largest share of profits. The Silicon Valley phenomenon, then, should continue with more innovations and profits being realised at the chip level. The business prospect of product assemblers—as in Hong Kong—remains weak.

In terms of training, in order to compete with overseas competitors, there will be significantly more demands on skills such as digital electronics engineers, embedded software programmers, ASIC designers, electronics manufacturing and packaging engineers and RF engineers particularly for those having the skills and experience in the high frequency area (above 2 GHz).

THE IMPLICATION OF ADVANCES IN WIRELESS DATA COMMUNICATIONS ON E-COMMERCE

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Abstract: The way we conduct our day to day business has undergone fundamental changes over the past ten years. With the emergence of Internet that links the world together, users have put a lot more emphasis on communicating through the electronics media such as email and fax. We now seldom write to each other through letters but rather we communicate more often through emails or even ICQ! With the imminent changes in the wireless data communications, the e-revolution that a lot of us are still trying hard to manage will extend from our desktop on to our hands. Internet connection will no longer be desk bound but will be extended to users who will be connected everywhere, all the time. This paper briefly examines the emerging technologies in the wireless data communications area and their effect on e-Commerce. Its implication to the training and skill development requirements for Hong Kong will also be examined.

FUNDAMENTAL CHANGES

Breaking out of the desktop

Together with Internet, e-Commerce has fundamentally changed the behaviour of many people and the way that many companies conducting their day to day business. The drivers for growth in the use of e-Commerce are:

1. the availability of better information infrastructure
2. the improvement in data security and integrity technology
3. innovative e-Commerce business concept
4. the exponential increase in network utilisation and its relationship to the degree of connectivity (MetCalfe's law)

With the increasing use of e-Commerce in B2C and B2B operations, the demand from the users, in terms of features, speed, ease of use, variety of products and logistic, on e-Commerce will only increase. Furthermore, with the advances in wired and wireless broad band data communications, the "shopping experience" in doing e-Commerce will only be improving continually.

Currently, e-Commerce experience is mainly desk bound. Users must access the Internet or Intranet through their desktop computers. With the significant advances in wireless data communications in the next few years, this will be changed. The availability of packet switched, continuously connected wireless communications regime, the circle of connectivity will be finally completed with users being able to be connected where-ever, whenever they require to.

Currently, connectivity to the Internet is mainly through wired lines. For most users, the connection will mainly be through desktop modems or local area networks. The technology trend (Figure 1) in the wired connection will mainly be towards higher bandwidth through the use of fibre optics. In terms of local area networks, gigabyte LAN or even 10-gigabyte LAN will help to ease the congestion in the ever increasing network traffic for large corporations.

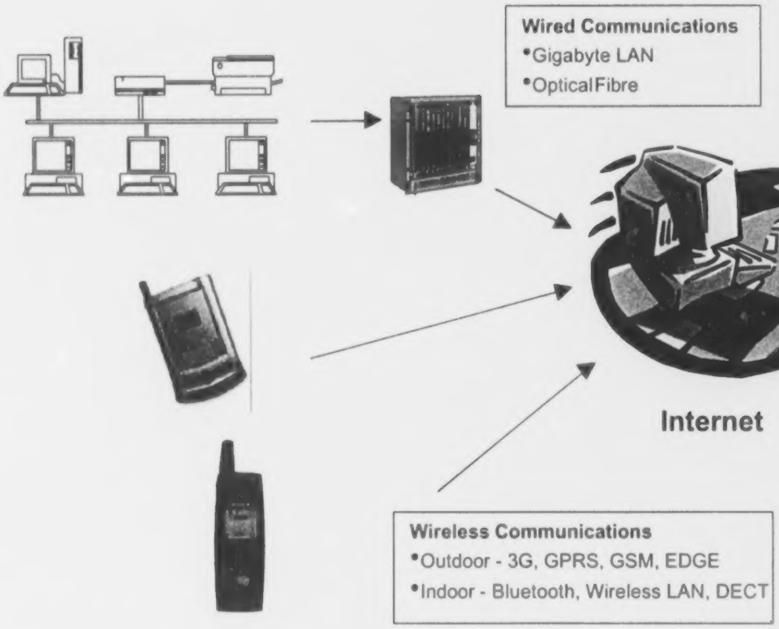
Wired Communications
•Gigabyte LAN
•OpticalFibre
Internet
Wireless Communications
•Outdoor - 3G, GPRS, GSM, EDGE
•Indoor - Bluetooth, Wireless LAN, DECT

Figure 1: Advances in Connectivity to the Internet

GPRS, EDGE, 3G

For wireless data communications, the trends will be heading towards digital, packet switched broad band communications. For outdoor, circuit switched GSM based narrow band data communications will be superseded by GPRS (General Packet Radio Service) packet switched technology. Through the progress from EDGE (Enhanced Data rate for Global Evolution) and 3G, the bandwidth of wireless communications will increase significantly from the current 9.6 Kbps up to 2 Mbps in the next two to three years. For 3G, Third Generation Mobile Telecommunications, the first commercial system will be deployed in Japan and Europe in 2002. With 3G, users will be able to access all kinds of digital information such as music, photos, video, television, while they are on the move, anywhere. In the interim, GPRS (General Packet Radio Service) will provide "always connected" wireless data network access of up to 100 K bit/s while EDGE (Enhanced Data Rates for Global Evolution) will further boost the data speeds allowing video and mobile multimedia applications with data rates as high as 384 K bit/s. GPRS will be available in Hong Kong by the end of 2000 while EDGE will be available next year (Figure 2).

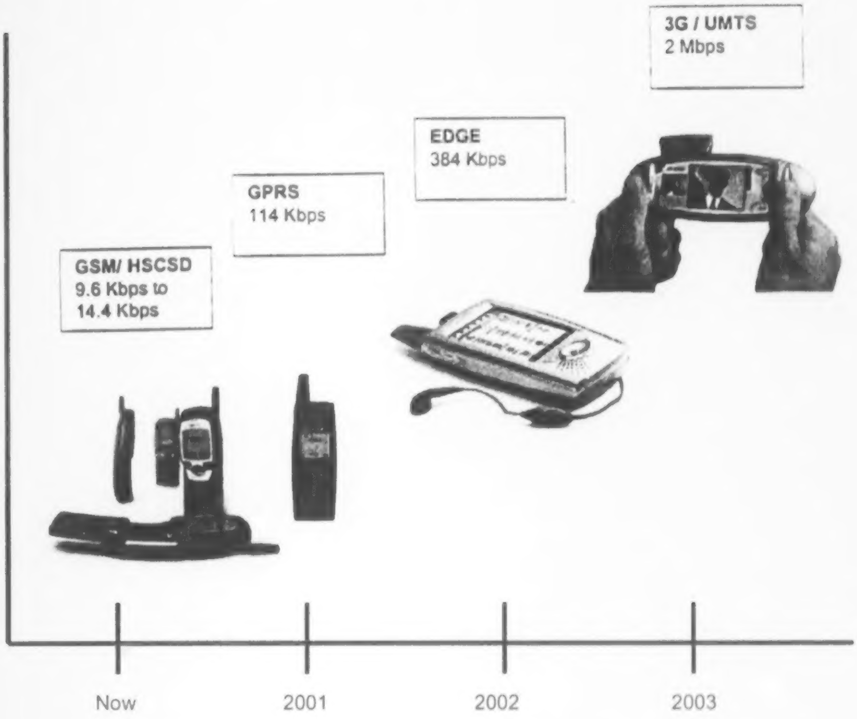

Figure 2: Wireless Data Communications Development

Circuit Switched and Packet Switched

The advantages of packet switched wireless network over the current circuit switched networks (Figure 3) are that firstly, it will be cheaper for data communications. As it is mainly developed for voice call functions, a circuit switched network is charging on a time basis, regardless of whether data is transmitted over the link for a data communication connection. So, for data connection purposes such as WEB browsing or even WAP browsing, the connection charge will be costly even for most of connection time, the link could be in an idle state. For a packet switched network, the charge involved should be much cheaper than a circuit switched network for such a network would be only charging for the bandwidth use rather than for the time used. Secondly, a packet switched network will have better control on data integrity. For a packet switched data transmission scheme, data are broken into many small packets and transmitted over the air. Data can be re-transmitted if they are found missing or lost over the transmission channel. Third, a packet switched data network will allow handheld or mobile devices to be continuously connected without the penalty of heavy connection charges. A packet switched network will not require the extra time to get a connection as in the case of the circuit switched network right now.

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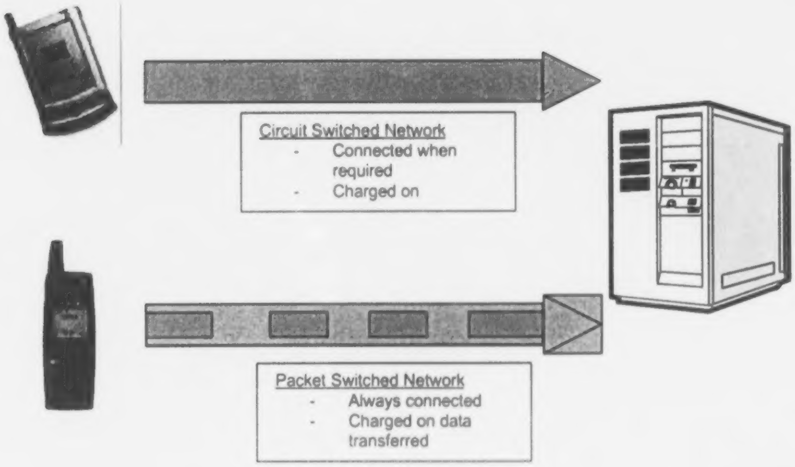

Figure 3: Switched Wireless Data Network

Bluetooth

For indoor, Bluetooth will become the prevailing trend for both wireless short range data and voice communications in the next few years. Bluetooth is the result of development effort of both the telecommunications and computer industries for the past few years and it aims to provide an effortless service for both home, mobile and business users with a low-cost and low-power radio based cable replacement technology. It operates in a unified frequency ISM band of 2.4 GHz. The initial cost for a Bluetooth module will be around US$20 but the increase in volume will eventually see the cost of such modules to drop to US$5. It has a gross data rate up to 1 Mbps with second generation devices going up to 2 Mbps. The integrated voice and data service will not only be the emerging standard for wireless LAN but the low cost of Bluetooth components will drive the increasing use of Bluetooth enabled devices at home as well. The low-power Bluetooth radio module is designed to be built into mobile phones, mobile computers, home appliances, wireless LAN modules, computer peripherals, and network gateways.

The performance of Bluetooth devices is very flexible and robust because the Bluetooth protocol features a range of flexible packet types. Further, using a frequency hop scheme allows Bluetooth devices to communicate in high data rate even in the presence of severe interference. The operating range is set at 10 metres which is optimised for power consumption and indoors short range usage.

THE IMPLICATION OF THESE ADVANCES

With these imminent advances in wireless data communications technology, the entire concept of the e-Commerce system will be migrating to a mobile commerce or ***m-Commerce*** system. It will be a system that allows users to perform business transactions, purchases, accesses to their data on the home server and even video conferencing, anywhere, any time. In the same way that cellular phones have fundamentally changed the way we communicate both in our personal life and in business, m-Commerce will take this one step further. Such development will provide strong opportunities for both the fields of Information Technology and Electronics and it further demonstrates the growing convergence of the two important fields in terms of opportunities, technology and market.

Wireless data communications will be the main focus for technology and product development in the next few years. The implication for Hong Kong in terms of training and development is that there will be significantly more demands on skills such as RF engineers particularly for those having the skills and experience in the high frequency area (above 2 GHz). As there are a lot more opportunities in new, small wireless devices utilising wireless technology such as Bluetooth, testing equipment and compliance technology will also need to be upgraded to cope with the increase demands.

Further, with the increase demands on m-Commerce and wireless devices, it can be foreseen that the demands on software engineers with specialities on both application software development as well as embedded software development will be significantly increased. In terms of embedded software development, software engineers will be contented no longer with only MCU assembly type programming but in a more structured real time system type programming.

In conclusion, the imminent revolution in wireless data communications development and m-Commerce will present a lot of opportunities for Hong Kong. Being in the forefront in the application and usage of telecommunications products in the world, Hong Kong is in a strong position to ride on this next wave of IT revolution. Suitable engineers, both in RF, hardware and software, need to be trained in order to cope with the significant increase in their demand, or else, the opportunities will be heading elsewhere.

NEW ROLES OF VOCATIONAL EDUCATION AND VOCATIONAL TEACHERS FOR TECHNOLOGICAL CHANGE: A CASE STUDY OF THE HONG KONG INSTITUTE OF VOCATIONAL EDUCATION

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Abstract: This study aims to identify the recent changes happened in the Hong Kong Institute of Vocational Education (IVE) and to investigate the new roles of vocational teachers for technological changes, in particular, Information Technology (IT). A number of recommendations were made to vocational teachers so that they can make significant changes to meet the demands and challenges brought by these changes.

BACKGROUND

The world is now moving into the 21st century with a major shift from the traditional era of industrial economy into the knowledge-based economy (Bate, 1999). With its economy undergoing structural changes, Hong Kong is moving from a 'labour intensive' industrial society into a knowledge-based society and will become a regional information and transport hub in the Asia Pacific region. To achieve this, our new generation is expected to

> take the initiative to think, question, communicate, collaborate, participate, experiment and explore so as to construct knowledge, develop multiple abilities and enhance their personal quality, thereby laying a sound foundation for life, work and lifelong learning (Education Commission, 2000, p. 125).

With such shift and expectations, the functions and roles of education have to be changed in order to cope with such changes. The promotion of life-long learning and the applications of technology, IT in particular, marks the fundamental changes in education in Hong Kong that affect every stakeholder in the system (Hong Kong Government, 1999).

Like any sector of education in Hong Kong, vocational education has also been undergoing rapid changes. Vocational education is no longer simply serving as a sifter of manpower nor a provider of technical qualifications, but a motivator of lifelong and student-centered learning. The Hong Kong Institute of Vocational Education[1] (IVE), the major vocational education provider in Hong Kong, has introduced significant changes in its operational structures and management systems (Segal Quince Wicksteed Limited, 1996). Among these changes, the development of key academic initiatives to support and enhance the quality of teachers has the most significant impact on IVE teachers. Such initiatives, coupled with the new demand on teachers as proposed by the Hong Kong Government, have brought new challenges to IVE teachers.

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[1] In 1999, the IVE provided more than 62,000 full-time and part-time places to students age from 16 and up from post secondary three to sub-degree level

Given the new challenges, the roles of teachers as well as skills demand on them will be changed accordingly. Teachers, as the most significant stakeholders in such process, will respectively change from an information provider to facilitator and mentor of student development. As Delors (1996) remarks,

> the need for change, from narrow nationalism to universalism, from ethnic and cultural prejudice to tolerance, understanding and pluralism, from autocracy to democracy in its various manifestations, and from a technologically divided world where high technology is the privilege of the few to a technologically united world, places enormous responsibilities on teachers who participate in the moulding of the characters and minds of the new generation (p. 141).

This paper studies the recent changes happened in IVE and attempts:

1) to identify the areas and reasons for change in the IVE; and
2) to explore the new roles of vocational teachers in the new millennium and the IT skill requirements demand on them, given the changes identified.

METHODS OF STUDY

In order to explore new roles of vocational education and vocational teachers for technological change, three main methods: questionnaire survey; personal interview; and document analysis, were used to gather information for this study.

Questionnaire Survey

Two questionnaire surveys were conducted in which one was with IVE students and the other was with IVE teachers. The student survey was on students' perception on an ideal learning environment and their applications of IT in learning, which affects the new role of IVE teachers. Three hundred first year students from six departments[2] of two IVE campuses participated in this survey. This questionnaire survey included 20 questions which asked students' perception of an ideal learning environment for two basic approaches of learning, i.e. the surface approach and deep approach as advocated by (Marton & Saljo, 1984). Students are requested to choose five requirements as their ideal learning environment among 20 questions, subsequently, questions with higher scores were regarded as the new expectation of students in their learning and new roles of teachers in their teaching (see Appendix 1 for details of questions).

The teacher survey was on teachers' competencies in using IT for teaching in IVE. One hundred and fifty teachers from two IVE campuses were given a questionnaire which required them to identify their IT competencies at three different levels [3] (see Appendices 2 & 3 (a) for details of the competencies). Consequently, a returned questionnaire with a high score indicates that the teacher has a high competency in IT skills and knowledge.

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[2] Departments of Business Administration, Electronic and Information Engineering, Printing, Applied Science, Computing and Design

[3] Questions 1 to 5, 6 to 13, and 14 to 21 represent the awareness level, application level, and advanced level of IT competencies of IVE teachers respectively.

Personal Interview

Structured personal interviews were conducted with 20 students from IVE's Kwun Tong campus and 25 teachers of two IVE campuses to gather opinions about the applications of IT in learning and the considerations of IT applications in teaching accordingly. The questions for these interviews are shown in Appendices 3 (b) & (c) for details.

Document Analysis

Internal documents were examined in order to find out the progress of applying IT in teaching and learning in IVE.

FINDINGS AND IMPLICATIONS

Student Survey

Among 300 delivered questionnaires, 238 completed questionnaires were received, representing a response rate of 79%. In the survey, over 29% of students: preferred teachers to be an explainer; entertainer and friend; liked to share with classmates and teachers; preferred for autonomy in learning; were eager to use lots of different learning methods; intended to understand; were more active in independent learning but de-emphasized the rote learning. In other words, they were seeking for higher level of learning - the deep approach and student-centered learning. Nevertheless, about 17% of students sought the surface approach of learning: preferred teachers to give effective notes and tell right answers as the learning aims. (The detailed analysis was also shown in Appendix 1).

Teacher Survey

Among 150 questionnaires delivered, 91 completed questionnaire were received, representing a response rate of 60%. Concerning the IT competencies IVE teachers achieved, it was revealed that over 80% of them were at the awareness level; over 39% of them were at the application level and below 18% of them were at the advanced level regarding their IT competence. A breakdown of the response was also shown in Appendix 2. It was reflected that most teachers achieved the basic skills and could apply these skills in their teaching.

Teachers also adopted a positive attitude to face the challenge of using IT in teaching and had already recognized the need to update and re-conceptualize their values of different IT competencies. These competencies were based upon the new directions and challenges that were significant to assist them to fulfill their new roles. However, teachers indicated that training programs offered to them by IVE should be strengthened to develop their IT knowledge to a higher level, e.g. the application and advanced levels as listed in the specifications of IT competencies for IVE teachers.

Structured Personal Interview with Students

In the interviews, most of the students preferred to have a flexible class where they could explore independent learning options and they were also comfortable with applying IT in their flexible learning. Most of the interviewees agreed that applications of IT in learning can assist them to learn more flexibly and effectively. They pointed out many advantages of applying IT in learning. For example, IT allows them unlimited time, space and format to learn. At the same time, it enables self-paced learning for students and helps teachers to empower them to have greater control over the learning process.

Furthermore, they use online Web facilities such as WebCT to access the event calendar, learning materials, course assignments and teachers' homepages, where teachers post information about their learning style, assignments, grades and lessons for independent study. This tool also helps them foster team building and enhance communication among diverse groups of classmates. As a result, they develop greater confidence that improve their ability to communicate and work with their classmates.

However, students reflected that the free booking of computer rooms plus the handful of computers in the library could not satisfy their demands. WebCT added extra load onto students because they could only gain access to the materials on the WebCT through the computers in the campus. This was also reflected in the consolidated report on 1999/2000 Student Personal Tutorial Interviews[4]. Some students opined that they were so keen on seeking for competition for a place in a Higher Diploma course[5], therefore, they preferred the traditional way of learning because teachers prepared all notes and took an active role which puts a heavy emphasis on examination-oriented tuition for them. This approach did not require teachers to apply any multimedia or IT to enhance their learning.

Structured Personal Interview with Teachers

Most of the teachers being interviewed agreed that IT in education: was accompanied by the sociological and economical pressure and would transform the way that education to be conducted; and IT enhanced the effectiveness, efficiency and flexibility of teaching and learning. They expected that IT will play an important part to provide professional, as well as causal 'on-line learning communities' in vocational education in the near future. Applying IT in teaching will help them to draw students' attention, arouse funs, break the barriers to communication such as time and distance, and monitor the progress of students.

In addition, IT allows teachers immediate access to up-to-date, diverse and specialist information, speed up the process of research and development and allows greater collaboration between industry and vocational education institutions both nationally and internationally. Nevertheless, teachers stressed that IT may not be suitably applied in all subjects because the conceptual nature or ideas of some subjects are difficult to be 'visualized' with IT. Therefore, the usefulness and suitability of applying IT in teaching different subjects should be reasonably judged in terms of learning objectives, motivation and prior knowledge of the learners.

They were also concerned that they may not have skills to use the latest IT and Internet technology (e.g. video-conference, email, chat-rooms, discussion lists, ICQ, etc) in the tradition or virtual 'classroom', as such innovation requires teachers to have sufficient training and a wide spectrum of skills to be developed. Some teachers pinpointed that most teachers and students were too accustomed to traditional approach of teaching and learning. They suggested that the applications of IT in teaching and learning should be implemented incrementally and IVE should reserve teachers and students enough time to adjust and to adopt.

Many teachers suggested that notebook computers should be widely deployed to teachers and students in the long run. In addition, they urged IVE to grant teachers subsidies to purchase their own personal computer. They also expressed that cooperation among staff of the Computing

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[4] It is IVE's policy that an interview will be conducted between a student and her/his personal tutor once a year.

[5] Students are admitted to Diploma course in their first entry to IVE. Depend upon their performance in their first year's study, they may be promoted to the second year of a Diploma course or a Higher Diploma course.

Division, Educational Technology Unit and teachers should be increased in order to make up the deficit in design expertise and create effective, relevant and quality resources to students.

Lastly, teachers reflected that traditional assessment, which may not be compatible with IT, was a barrier to promote student-centred learning. Moreover, IT may not be able to assess the learning process and higher-level learning outcomes, such as innovation, thinking skill, problem solving, etc.

Document Analysis

As reflected in the documents collected hereunder, it was already visible that there has been an organizational change taken place in IVE. Concerning the new roles of IVE teachers, some significant and related initiatives were also made. These include:

1) A major curriculum revamp exercise was conducted by a rationalization of all IVE courses into a new system, which involved the development of a series of new courses across every discipline among each IVE campuses (VTC Annual Report, 1998/99);
2) The provision of an IT training programmes for teachers via the Teaching and Learning Centre (see Appendices 3 (d) & 4 (a) for details);
3) The enhancement of IVE's IT infrastructure (see Appendix 4 (b) for details);
4) The establishment of a Staff Training and Development Scheme

   A total of 40 members of staff received such sponsorship and the total amount reimbursed was around $750,000 in 1999. (see VTC Annual Report, 1998/99 for details)

IMPLICATIONS FOR TEACHERS IN RESPONSE TO NEW EXPECTATIONS AND LEARNING MODE OF STUDENTS

Redefine the New Roles of Teachers

In order to encourage students to develop a deep approach for student-centered learning, teachers should help students to acquire collaborative, technological and problem-solving skills. Teachers may use technology as a 'conceptual environment' in which students acquired and explored. As a result, teachers will help to build up students' independent learning and thinking. To achieve these, as identified in the 'findings section', it is commonly believed that the new roles of IVE teachers will act as facilitators, mentors and models who may share the joy of learning process with students, arouse students' curiosity and initiatives to learn, facilitate students' self-centered and long-life learning and extend educational opportunities and communication opportunities. They should attempt to accomplish the networked outlook and experiences beyond their own institutes in any time frame, develop a new professional culture, and multiply their teaching effects through mutual sharing with other institutes nationally and internationally.

Identify New Skills

For the successfully integration of technology in the overall learning environment, on-going training and support at all levels is essential (Aust & Padmanabhan, 1994). In IVE, a number of IT workshops were provided to IVE teachers to up-date and up-grade their IT competencies. However, teachers do demand more high level IT training, as reported from the 'findings'.

Tailor the Curriculum

Teachers should be given a freer hand to exercise their professional judgment so that they will have more flexibility in refining the curriculum and assessment as well as to arrange lesson time according to students' characteristics and needs. In the long run, IVE has to streamline the work procedure, to reduce teachers' workload and to arrange a flexible teaching time so that teachers can devote more time and efforts to design better curriculum, activities and resources as well as to provide students with a comprehensive learning experience.

Establish Collegiality

Transforming information into quality IT teaching and learning resources demands a vast amount of time and effort. By involving different expertise from different parts of IVE may be more productive. Therefore, a team approach towards resource development will be appropriate. With clearly defined roles and responsibility in the team, different experts will contribute to different areas of resource development in the most effective and efficient way.

Provide Hardware and Software Support

Appropriate support to teachers is essential for teachers to make the most of IT for teaching. With better IT provisions, teacher will be able to prepare better quality teaching resources, to search latest resources and to communicate with students at the time and place which are of most convenient to them and their students.

RECOMMENDATIONS

In order to assist IVE teachers to fulfill their new roles under the constraints and difficulties mentioned by teachers and students and to build up an institutional-wide IT pedagogical environment, the following recommendations were made:

1) IT programs provided to IVE teachers should be focused on developing teachers' knowledge to a higher level of skill such as application and advanced level of IT competencies. Training on more up-to-date software and hardware should be incorporated into these programs. Modern pedagogy in using IT to enhance the quality of teaching and learning should be introduced in addition to IT skill training.
2) Besides the HK$176.9M being granted, IVE should continue to seek extra funding to improve its technological infrastructure and support to teaching and learning using IT. To allow teachers to make the most of IT for teaching, i.e. the flexibility of time, pace, place, etc, IVE should provide teachers and students free Internet access at home, up-to-date hardware (e.g. notebook computers) and latest software.
3) A team approach has been proven to be one of the best means towards resource development. Teachers should team up with other experts in IVE, e.g. IT experts from the Computing Division, production professionals from the Educational Technology Units, etc. to develop quality IT resources for their teaching. They may also build up collaboration with other partners from other institutes for better resources and to get fruitful opportunities for curriculum enhancement.

LIMITATIONS

Certain limitations arose in this study. Firstly, the questionnaire survey and the interviews were only conducted in two IVE campuses. Therefore, the sample size was relatively small and thus the results of the study should not be generalised to the whole IVE. Secondly, the criterion of IT competencies for IVE teachers and the questions of student's ideal learning environment designed in the questionnaires might only reflect part of the IT capabilities that some teachers possessed and part of the expectations that the students seek. However, this is only a starting point to study the employment of IT in teaching and learning in vocational education in Hong Kong and we invite readers who are interested in this topic to further investigate and share their experience with us.

CONCLUSION

Change requires new mindsets and attitude from students, teachers and the education institute. To meet the changing nature of student population and a growing percentage of students who have already had a lot of experience with technology and high expectations of the educational institute, IVE must formulate a technology vision in order to realign itself to stay ahead of the trends. Moreover, the institute should review and revise its strategic plan that commits to the provision of high quality vocational education in Hong Kong. As educators, we must be brave to re-examine our traditional assumptions about teaching and learning and re-assure our role as facilitators of knowledge acquisition. At the same time, we should stimulate students to re-think their responsibilities in learning so that they will become independent and life-long learners. At last, but not the least, we should bear in mind that IT is only a tool to facilitate quality learning and teaching. However, the teachers who are willing to equip themselves to meet the challenges which derived from the new roles, showing genuine care to students and committing themselves in teaching, are most valuable to our students and the society.

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Appendix 1

Questionnaires and Summary of Findings in "Student's Ideal Learning Environment"
Questionnaires - (Shatin and Kwun Tong Campuses/Conducted on 31/5/00, 2/6/00 and 5/6/00)

Campus: ________________________ Department: ________________________

(The purpose of this questionnaire is to collect the opinion of students on their ideal learning environment. The information provided will be kept in strictest confidential and used for this purpose only. The followings were modified from ***Moore & Fitch Inventory of Learning Preferences****.) Each of us has an ideal learning environment. Think how you learn best. You have 5 check marks ("x") to distribute among 20 questions. Put a check mark in the "x" column next to the statement that best describes your ideal learning* ***environment.***

No of Rank.	My Ideal Learning Environment/Question No/No of Votes	% of Choice
1	Would have the lecturer/assistant lecturer who was not just an instructor, but more an explainer, entertainer and friend? (Q.11)/122	51%
2	Would encourage me to learn using lots of different learning methods? (Q.12)/118	49%
3	Would provide a flexible class where I can explore independent learning options? (Q.18)/109	45%
4	Would be where learning is a mutual experience where I contribute to the teaching and learning in class? (Q.8)/95	40%
5	Would be where the lecturers/assistant lecturers doesn't tell me the answers; rather he/she shows me how to find the answers for myself? (Q.7)/87	37%
6	Would provide a classroom atmosphere of exploring and debating new ideas? (Q.13)/78	32%
7	Would be where I can make connections among various subject areas and am encouraged to construct an adequate argument? (Q.20)/76	31%
8	Would provide a workshop or seminar atmosphere so that we can exchange ideas and evaluate our own perspectives on the subject matter? (Q.17)/74	30%
9	Would value my classmates as sources of information, not only as companions? (Q.10)/72	30%
10	Would be a 'free-flowing' class that does not follow a strict outline?(Q.16)/72	30%
11	Would be where I would have a lot of control over the course content and class discussion? (Q.3)/70	29%
12	Would be where I take effective notes on what is presented in class and reproduce that information on tests? (Q.4)/40	17%
13	Would emphasize class discussion but I would expect the lecturers/assistant lecturers to tell the right answer? (Q.5)/36	15%
14	Would have the focus on having the right answers rather than on discussing methods on how to solve the problems? (Q.9)/27	11%
15	Would have the lecturers/assistant lecturers give me all the theory and information I need to know? (Q.2)/27	11%
16	Would include straightforward, not 'tricky' tests, covering only what has been taught and nothing else? (Q.6)/26	10%
17	Would be where I could listen intently to the lecturer/assistant lecturer and not to classmates and peers for answers to questions? (Q.19)/25	10%
18	Would be lectures since I can get the information I need to know most efficiently? (Q.15)/25	10%
19	Would provide assignments with practice everyday applications? (Q.1)/23	9%
20	Would include exams and assessment as part of the learning process? (Q.14)/20	8%

Note: Ranking No 1 to 11 and 12 to 20 represent the "Deep Approach" and "Surface Approach" learning respectively

Appendix 2

Questionnaires and Summary of the Findings in "Teacher's IT Competence" Questionnaires
(Shatin and Kwun Tong Campuses /Conducted on 31/5/00 and 2/6/00)

Campus: ______________________ Department: ______________________

(The purpose of this questionnaire is to identify the IT competence of teachers. The information provided will be kept in strictest confidential and used for this purpose only. The followings were modified from Alfred Koo's proforma, namely, an "IT Capability Enhancement Plan" in IT Enhancement Program for IVE teachers)

Enter a **"x"** in the empty boxes to indicate some of your IT competence and leave it blank if you do not know.

Crit. No	*IT Skills- Awareness Level*	*No of Votes/ % of IT Capabilities*
1	Handle computer Operating System	81 (89%)
2	Use local network to transfer/retrieve/save materials and to share them among teachers and/or students	77 (84%)
3	Operate basic computer peripheral equipment to prepare simple teaching materials	88 (96%)
4	Access to WWW with a browser to search, retrieve information & TL resources	85 (93%)
5	Basic understanding of the implications of IT in education	75 (80%)
	IT Skills – Application Level	
6	Prepare course materials (e.g. curriculum documents, lecture notes, lab sheets etc) using a word processor	92 (92%)
7	Use spreadsheet/database application to handle teaching related tasks including course scheduling, student assessment, etc)	74 (81%)
8	Use graphic program to create simple graphics for educational illustrations	54 (70%)
9	Prepare a lecture presentation using presentation software	70 (76%)
10	Use e-mail (with attachment, if necessary) to communicate with colleagues and students	90 (76%)
11	Create text-based web pages to supplement classroom teaching	31 (50%)
12	Apply basic instructional design skills in planning TL materials/activities	47 (51%)
13	Understand the basic concept & principles of web based instructions & a CMDP	36 (39%)
14	Create a multimedia presentation with presentation software	20 (21%)
	IT Skills – Advanced Level	
15	Create a simple interactive program on a specific topic with presentation software and/or authoring tools for student learning	17 (18%)
16	Use asynchronized communications on web including mailing lists, newsgroups and discussion forums to enhance teaching effectiveness	17 (18%)
17	Use synchronized communications on web including chat room, IRC, Netmeeting, etc to enhance teaching effectiveness	7 (7%)
18	Manage a web based course/module using a CMDP	12 (13%)
19	Create a web site for TL purposes	17 (18%)
20	Apply advanced instructional design skills to enhance quality of TL materials	11 (12%)
21	Apply project management skills to develop TL materials with a team of staff	13 (14%)

Note: TL = teaching and learning CMDP = Course Management and Delivery Platform

Appendix 3 – (a)

Definitions of Three Levels of Teacher's IT Competence

(The IT Enhancement Programme has been designed to match different levels of IT competency with the courses that may be available to IVE teacher.)

Awareness Level

(teachers build up foundation skills and become comfortable using it jargon, and in using general it productivity tools.)

Application Level

(teachers become more knowledgeable about how to select the computer-based information, and to integrate it into their lessons.)

Advanced Level

(teachers become very adept using computers, even too the extent they can author their own multimedia material for use in their classes, and to design and maintain their instructional web sites.)

Appendix 3 – (b)

Questions Used in Structured Personal Interview with Students

1 Do you agree that the application of IT in learning is flexible?

2 Do you agree that the application of IT in learning is effective?

3 Do you agree that the application of IT in learning will help the communication between the teachers and students?

4 What can IT be used in facilitating the learning process? In what aspects?

5 What are the constraints of applying IT in learning?

Appendix 3 – (c)

Questions Used in Structured Personal Interview with Teachers

1 Do you agree that the integration of IT into education has been accompanied by sociological and economical pressure?

2 Do you agree that IT has the potential to transform the way/method that education is conducted and enhance the effectiveness, efficiency and flexibility of teaching and learning?

3 What are the advantages of applying IT in teaching?

4 What are the limitations of using IT in teaching?

5 What are the considerations of applying IT in teaching?

Appendix 3 – (d)

The Provision of an IT Training Programmes for Teachers via The Teaching and Learning Centre (Accumulated Attendance of IT Enhancement Programme) (May 1999 - February 2000)

Course Name	Attendance
Principles in Using IT for Teaching and Learning	
IT in Teaching and Learning: Fundamental/Educational Issues	115
IT in Teaching and Learning: Design Issues	82
Basic Principles of Web Based Instruction	19
PowerPoint	
Preparing Lecture Presentation with PowerPoint: Basic Skills	101
Power Up Your Presentation with PowerPoint	91
Preparing Interactive Multi Media Lecture Presentation with PowerPoint	94

Appendix 4 – (a)

The Provision of an IT Training Programmes for Teachers via
The Teaching and Learning Centre
(Accumulated Attendance of IT Enhancement Programme – Cont'd)
(May 1999 - February 2000)

Course Name	**Attendance**	
Web Design/Teaching		
Understanding HTML	11	
Basic Web Page Design for Teaching and Learning	109	
Developing Web Page for Teaching and Learning	73	
Teaching with the WWW	82	
Making Static Web Pages to Delivery Teaching and Learning	7	
Enhancing Communication Using the Campus Network/Web	107	
WebCT#		
Making Use of Course Management & Delivery Platform with WebCT	77	
Building WBI Courses with WebCT	12	198 *
Course Management Using WebCT	5	88 *
Creating On-line Quizzes with WebCT	51	13 *
WebCT in Action	5	10 *
Webpage Building Workshop		28 *
Workshop for Graphics/Photos on the Webs		25 *
	1041	362
Total	**1403**	

including Training the Trainers Programmes

* Course Offered by Educational Technology Unit

Appendix 4 – (b)

The Enhancement of IVE's IT Infrastructure

(I) Use of IT for Quality Vocational Education

For example, additional PCs for students, Web-based teaching and learning service, enhancement of the information technology, remote dial-up and mobile PC access service, video conferencing services, replacement of outmoded IT facilities, increased Internet access, server enhancement, etc.

(II) MIS and User Services Enhancement

For example, enhancement of MIS infrastructure to enhance interface, data warehousing of IVE, Web-based MIS, executive information system, e-mail accounts for all staff, etc.

(III) Network Infrastructure Enhancement

For example, upgrade of Internet facilities with Internet access for all PCs in IVE campuses, enhancement of network security, installation of high speed wide area network connecting the nine IVE campuses and three training centre complexes, and the headquarters, electronic library upgrade, etc.

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THE OCCUPATIONAL SKILL TESTING AND CERTIFICATION SYSTEMS IN HONG KONG

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Index : Skill Testing / Competence / Certification System / Recognition

Abstract: For the purpose of setting standards for skilled workers and facilitating the acquisition of recognised qualifications, the Vocational Training Council introduced in 1989 a voluntary trade testing and certification system in various industries. Up to now, the number of trades for skill testing has been increased to 32. Some 24 000 workers have sit for the tests with some 14 000 passing the tests.

The trade test certificates have gained wide recognition by the industries, the government and the public. In February 1998, the scheme has been expanded to cover also the intermediate tradesmen/semi-skilled workers. This paper describes in detail the skill testing and certification system in Hong Kong, including its operating procedures, the past experience and future developments.

1. INTRODUCTION

1.1 In order to continuously improve the competitiveness of its industrial products and services in the world markets, Hong Kong began to adopt a systematic approach to upgrade its occupational skill standards. With this in mind, the Vocational Training Council (VTC), established by the Hong Kong Government in 1982, has put in place a comprehensive system for trade testing and certification of skilled workers.

1.2 To cope with the development needs of industry, the VTC has set up a number of training boards and general committees, which cover the majority of economic sectors in Hong Kong. The membership of the training boards and general committees includes representatives from employers, employers' associations, workers unions, tertiary institutions and relevant government departments, with the majority of members from industry and commerce.

1.3 Since early eighties, the training boards of many industries considered that there was a need to have sets of trade test guidelines for the assessment of skill competence of a craftsman. The trade test guidelines laid down the test formats, skills to be tested, marking schemes, pass criteria, test duration and required facilities for each principal job in the industry. The guidelines enable employers in ascertaining the standard of skills and knowledge attained by their workers as well as provide employers a means of assessing the competence of a candidate for job.

1.4 After some years of operating experience, employers in the industries felt that the standard of skill tests conducted by individual employers varied greatly. To ensure an uniform standard, there should be some authorized organizations such as the VTC to co-ordinate trade tests on an industry-wide basis. In 1989, voluntary trade testing and certification system was set up by VTC for Electricians, Computerized Typesetters and Mechanical Fitters.

2. TRADE TEST

2.1 The objectives of the trade tests are:

(a)to help industry in the selection of workers for skilled jobs;

(b)to facilitate the acquisition of recognized qualifications, in particular, for those who have not gone through any formal training, and enhance the status of skilled workers;

(c)to set the specifications related to standards for skilled workers;

(d)with the agreement of the licensing authorities to facilitate the recognition of skill standards attained for the purpose of licensing; and

(e)to facilitate the establishment of skill hierarchy for career advancement of skilled workers.

2.2 For the purpose of meeting the increasing demand from the industries, the trade testing and certification scheme has been drastically expanded. Up to now, the scheme covers 32 trades. In 1999, some 7 000 applicants sat for trade tests and some 5 000 candidates passed the tests with trade certificates awarded. Statistics on trade tests for craftsmen are at Appendix.

2.3 Each trade test normally consists of 2 parts, a knowledge test in the form of multiple-choice questions and a practical test. Candidates who pass the knowledge test and the practical test, either at the same sitting or at different sittings within a time span of three years will be awarded a trade test certificate. The formats of the trade tests together with syllabuses and examples are published in the trade test guidebooks, which are issued to the candidates during enrollment.

2.4 The design and standards of the trade tests are established by the respective trade testing committees of the training boards. Test questions are set by technical experts and professionals from institutions and industry.

2.5 Before putting into use, the test questions will be tried out by in-services workers with adequate relevant working experience. Based on the trial run results, the trade testing committee will then adjust and fine-tune the test questions, testing facilities, marking schemes and test duration. The testing committee designs sufficient test questions to form a test question bank. The test questions are updated periodically and new questions are added to the test question bank. For each session of trade test, a set of questions will be drawn randomly from the test question bank to form a test paper.

2.6 Advertisements will be placed in the local press to invite applications for trade tests. Applications forms can be cut down from the local press and will also be available free from the Trade Test Registry. Workers can enroll for trade tests by submitting their applications (by hand or by mail) to the Trade Test Registry with a cheque or bank draft to pay the test fee. To attract more workers in the trade to trade tests, the test fee has been set at a very low level. At present, the test fee ranges HK$150 in the case of tests conducted by VTC to a few hundred dollars for tests conducted by the Construction Industry Training Authority (CITA).

2.7 The duration of knowledge tests is normally 1 hour and a practical test 1-day. For the practical test, the invigilators carry out in-process assessments and end of assignment assessments objectively according to the approved marking schemes. Candidates will be informed of their test results by post. If a candidate is dissatisfied with the test results, he/she may apply to the training boards for a review of the test results.

2.8 To ensure the validity and practicability of the trade tests, the trade testing committees review the test questions and the trade testing procedures regularly.

2.9 The electrician trade has the largest number of applicants. Trade test certificates for electricians are recognised as one of the qualifications for registering as a licensed worker for Class A electrical works by the Electrical and Mechanical Services Department of the HKSAR Government. Construction trades also attract a lot of applicants. It is mainly due to the specific requirement in the construction and maintenance engineering project contracts imposed by the Works Departments and the Housing Authority of the HKSAR Government requiring their contractors to employ a certain percentage of qualified tradesmen holding either trade certificates, apprenticeship certificates or licensed worker certificates as a measure to ensure the quality of construction work.

3.INTERMEDIATE TRADE TEST

3.1 For the purpose of assuring an adequate supply of technical manpower and setting standards for semi-skilled workers in the construction industry, the CITA and VTC have also put in place an intermediate trade testing scheme since early 1998 for the following fourteen building and civil engineering trades and five electrical and mechanical (E & M) trade skills:

(a) bar bender and finer,
(b) bricklayer,
(c) bamboo scaffolder,
(d) carpenter,
(e) concretor,
(f) general welder,
(g) joiner,
(h) leveller,
(i) marble worker,
(j) metal worker,
(k) painter,
(l) plumber,
(m) plasterer,
(n) tiler,
(o) electrical work,
(p) mechanical fitting,
(q) pipe work (E & M),
(r) sheet metal wok, and
(s) welding (E & M)

The tests for the first fourteen trades are organized by the CITA and the last five E & M trade skills tests are offered by the VTC.

3.2 In June 1999, the intermediate trade tests on pipe work (E & M) was split into 3 modules, namely black steel pipe module, copper pipe module and galvanized-iron pipe module, to meet the demand from fire services engineering workers.

3.3 Those who have passed the tests will have their names put on a register kept by the Labour Department for their priority of employment. Refresher/remedial training courses are also organized by CITA and VTC for workers who fail in the tests to prepare them to re-sit the tests.

3.4 Since the commencement of the intermediate trade tests in January 1998. Some 21 000 applications have been received and 17 000 candidates passed with certificate awarded.

4. RECOGNITION

4.1 Trade test certificates and intermediate trade test certificates are widely recognized by the public, industries and government departments as qualifications for job seeking, job assignments and career development.

4.2 The Works Bureau and Housing Authority of the HKSAR Government have implemented contractual requirements in their works and building contracts to employ a certain minimum percentage of qualified tradesman and intermediate tradesman. Trade test certificate holder is recognized to be a qualified tradesman and intermediate trade test certificate is the sole recognized qualification for a qualified intermediate tradesman. The minimum percentage of the requirements will be increased by stages.

4.3 The trade test certificates of electrician and air-conditioning mechanic (electrical control module) have been recognized by the government for the purpose of registration of Grade A and Grade R (Air-conditioning) electrical workers respectively.

5.FUTURE TREND

5.1 The Works Bureau of the HKSAR Government is in the process of instituting a scheme to register all construction workers. To implement the scheme, the existing trade testing for electrical and mechanical (E&M) trades will be split into modules and also the trade testing scheme will be expanded to cover other construction trades.

5.2 The Electrical and Mechanical Engineering Services Department of HKSAR government is also proposing the following two new schemes:

a. Licensing of vehicle repairers

b. Registration of lift workers

The implementation of scheme (a) will require VTC to substantially expand the existing trade testing facilities for testing vehicle repair workers. Scheme (b) will also require VTC to set up new testing facilities for testing lift workers in the long run.

5.3 In 1999, VTC commissioned a consultancy study on Hong Kong's Apprenticeship and Trade Testing System. One of the consultant's recommendations is that Hong Kong should institute a compulsory trade testing system to assess the skill competence of apprentices who have completed their apprenticeship training. VTC is now actively exploring the practicality of this recommendation.

6.CONCLUSION

6.1 The trade testing and certification system plays a key role in facilitating the acqusition of recognized qualifications and the establishment of skills hierarchy for career development of skilled workers. Much has been done and achieved in Hong Kong's trade testing and certification system in the past decade. However, much remains to be done. With the support given by the Government, employers and the workers, we are convinced that the system could be further developed to benefit not only the local workers but also the economy as a whole.

Appendix

Statistics of Trade Tests for Craftsmen
(from July 1989 to March 2000 Applications)

Industry	Trade	Year of Commencing	Total No. of Applications	Total No. Passed (up to 30.4.2000)	Total No. Attended Test in 1999/2000	Total No. Passed in 1999/2000	Pass Rate
Automobile	Vehicle Body Repairer	1994	263	92	39	17	44%
	Vehicle Electrician	1992	223	51	32	9	28%
	Vehicle Mechanic	1989	1 735	470	106	33	31%
	Vehicle Painter	1996	209	71	29	6	21%
	Sub-total		**2 430**	**684**	**206**	**65**	**32%**
Building & Civil Engineering	Bar Bender and Fixer	1995	1 516	1 148	556	469	84%
	Bricklayer	1993	375	287	117	93	79%
	Bamboo Scaffolder	1995	966	712	373	302	81%
	Carpenter	1993	1 777	1 288	654	559	85%
	Concretor	1995	373	259	85	58	68%
	Drainlayer	1999	55	28	39	28	72%
	General Welder	1996	1 481	897	670	455	68%
	Joiner	1993	1 534	1 017	302	197	65%
	Leveller	1995	1 416	814	452	309	68%
	Marble Worker	1995	190	155	148	131	89%
	Metal Worker	1995	321	238	114	99	87%
	Painter & Decorator	1993	1 835	1 215	498	341	68%
	Plumber	1995	1 837	906	549	301	55%
	Plasterer	1993	1 105	771	471	409	87%
	Steel Welder (replaced by General Welder in 1996)	1995	86	17	-	-	-
	Tiler	1993	744	540	302	243	80%
	Sub-total		**15 611**	**10 292**	**5 330**	**3 994**	**75%**
Electrical & Mechanical Services	Electrician	1989	7 976	2 000	700	219	31%
	Air-cond. (Elect. Control)	1998	25	6	13	4	31%
	Air-cond. (Refrigeration)	1998	42	8	18	1	6%
	Sub-total		**8 043**	**2 014**	**731**	**224**	**31%**
Jewellery	Goldsmith (Fine-gold)	1996	4	2	0	0	-
	Goldsmith (K-gold)	1993	134	72	1	1	100%
	Precious Stone Setter	1994	43	29	1	1	100%
	Sub-total		**181**	**103**	**2**	**2**	**100%**
Machine Shop & Metal Working	Machinist	1993	116	52	4	3	75%
	Mechanical Fitter	1989	505	262	5	5	100%
	Sub-total		**621**	**314**	**9**	**8**	**89%**
Plastics	Mould and Die Maker	1990	494	275	13	6	46%
	Sub-total		**494**	**275**	**13**	**6**	**46%**
Printing	Colour Scanner Operator (replaced in 1995)	1993	5	1	-	-	-
	Offset Litho Platemaker (replaced in 1995)	1993	21	5	-	-	-
	Process Camera Operator (replaced in 1995)	1993	12	2	-	-	-
	Printing Machine Operator	1996	90	28	8	3	38%
	Typesetter (replaced in 1994)	1989	27	15	-	-	-
	Sub-total		**155**	**51**	**8**	**3**	**38%**
Precision Tooling	CNC Lathe Operator	1996	12	3	0	0	-
	CNC Machining Centre Operator	1996	42	16	0	0	-
	CNC Wirecut EDM Operator	1997	19	4	0	0	-
	Sub-total		**73**	**23**	**0**	**0**	-
	Total		**27 608**	**13 756**	**6 299**	**4 302**	**68%**

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DISTANCE AND OPEN LEARNING – WEB-BASED TRAINING (WBT) DEVELOPMENT PROCESS CONSIDERATION

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Index: distance Learning, Web-based training, WBT, eLearning, Process

Abstract: Learning is undergoing a revolution as technology provides effective and engaging channels to deliver training to multiple locations when audience can learn, communicate, email, chat, video-conferencing with instructors and others.

This paper highlighted some major fundamental development process someone needs to consider to develop an effective and interactive web-based learning system.

INTRODUCTION

In traditional teaching, the instructor normally stands in front of a classroom filled with 30 or more students. Lectures are being conducted verbally with course materials occasionally transcribed on chalkboards or projected onto a screen. Students usually are frantically copying down words from the screen. A well-planned class may include some question and answer types of discussion. Tests and exams are normally given during class. A portion of class time is normally devoted to review test and exam results. These are things teachers and students in traditional classes do.

Today, the traditional model where teachers stand in front of a class and students sit in a physical classroom at a predefined time is no longer the only teaching and learning environment. The coming of the Web environment brings with it the need for individuals involved in teaching and learning to take their education materials to the next level. The beauty of the Web is that it provides an entirely new context for teaching and learning. It removes the physical and the constraints for instructors as well as learners.

Learning is undergoing a revolution as technology provides effective and engaging channels to deliver training to multiple locations when audience can learn, communicate, email, chat, video-conferencing with instructors and other learners. The increasing use of Web-based training for the delivery of education has brought convenience and flexibility to learners, trainers and the offering institutions. To day, WBT has become important to corporations, small businesses and individuals to develop, deliver and receive training at anytime and from anywhere. The benefit of WBT provides a broad reach of multiple audiences and has high potential customization to address various learning style and needs.

With the rapid growth of Internet technology, multimedia and network bandwidth in recent years, we have experienced a shift of paradigm in doing business, acquire knowledge, pursue education and conduct training. It is undoubly that the community is moving towards a more efficient and effective way to deliver and receive education and training.

Web based training is not just another format for instructor-led or self-paced education. It is a learner centric, interactive, nonlinear, graphical, structural and effective use of the power of multimedia to present knowledge to the community.

However, WBT is not a total replacement of classroom teaching. It is definitely not the solution for every type of training topics. It is appropriate for teaching imparting kinds of knowledge, such as software application, management skills, listening and writing skills, company rules. WBT is also good in providing continuous learning, keeping knowledge current and supplementing instructor-led-courses. Training involves complex physical movement such as operating a truck or driving a car is very difficult to convert to WBT due to this kind of training requires environment and instant feedbacks and mentoring from the instructor.

An effective Web-based training project will not be successful without a team of committed professionals. Therefore the very first thing is to establish a qualified project team to facilitate the design and development of WBT.

WBT Team:

The followings are suggested roles and responsibilities of a basic WBT project team:

a.) A Project Manager - for overseeing the overall team activities and coordination.

b.) A Course Instructor - for developing the course contents and instructional strategies of the course.

c.) An Instructional Designer - for conducting the needs and analysis, choosing the most appropriate forms of web-based training designed lessons and media tools, and developing blueprint.

d.) A Subject Master Expert/Editor - for establishing the needs analysis with the instructional designer and reviewing the goals and accuracy of the subject.

e.) A Legal counsel - for reviewing the design documents to ensure there are no improper use of proprietary information and violations of copyrights, and use of trademarks.

f.) Programmers – for developing web pages and creating scripts.

g.) Multimedia Expert/Graphics Artist - for visual design of the course materials and the Web sites.

h.) Technical Support Staff - for preparing the WBT infrastructure for the delivery of the Web courses and helping the team and learners in their use of the infrastructure for WBT courses.

i.) Learners – can be involved in the beginning and ending of the project. They are expected to provide information and feedbacks of WBT courses.

Development Process Consideration

WBT can be developed with four major phases. They are namely Instructional Design, Course Development, WBT Pilot and Deployment. The purpose of this paper is to explore the needs of these important phases and to discuss how these phases are brought together to make WBT works.

1. Instructional Design Phase:

Instructional Design is the major process of designing the environment, methodology, and resources in addition to developing instructions and strategies for effective learning of course objectives.

The following are the suggested items to be considered for designing instructional materials for WBT:

a.) The target audience of your instructional materials.

b.) The level of knowledge the learners know and don't know.

c.) The level of computer knowledge your learners required to participate in WBT

d.) The goal and objectives of the course.

e.) The expectation of learners wanted to accomplish from the course.

f.) The delivery environment such as network infrastructure and learner workstation requirements.

g.) The determination of training methods. In this design, a single training method or a combination of methods can be used. This includes partial traditional classroom instructions; self-paced workbook exercises and tests; design facility to allow student-to-instructor and student-to-student activities.

h.) The interactions and tools that can provide assistance to learn and communicate with instructors and other learners.

i.) The creation of a detail blueprint for courses and student administration and tracking process and system.

j.) The creation of a detail blueprint on course interactions, feedbacks, and information structures.

k.) The technical limitations such as small bandwidth and differences among browsers that might cause technical problems.

l.) The business limitations such as corporate culture and contractual obligations.

2. Course Development Phase:

Moving classroom courses to WBT environment provides opportunity to re-evaluate the strength and weakness of a course. During the process of either redesigning or converting classroom courses to WBT courses, incremental assessment is crucial to ensure that the development of the course contents and design, the learners' feedbacks as well as the instructional design and supports are sufficient to deliver the Web-based training courses effectively to the audience.

The following are the suggested items to be considered:

a.) Course goal, objectives and contents must be assessed for factual integrity and completeness.

b.) Types of dialogue support.

c.) Teaching and learning strategies such as the forms and frequency of lectures, discussions, mentoring, feedbacks, questions and answers.

d.) Hardware, software, network infrastructure and support.

e.) Forms and frequency of assessment such as tests, exams, group assignments, discussions, vocabulary, examples, practices etc.

f.) The clarity of smoothness of directions, level of interest, and effectiveness of instructions.

3. WBT Pilot Phase:

The purpose of conducting a WBT pilot is to evaluate the technology infrastructure and the effectiveness of the entire instructional design. The results of the pilot can also be used to set the tone for the deployment and support requirements in the implementation phase.

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The following are the suggested items to be considered in conducting an effective WBT pilot:

- a.) Carefully select a group of accountable learners and support personnel to participate in the pilot.
- b.) Clearly define the pilot objectives, tasks, roles and responsibilities to the pilot group.
- c.) Define measurable evaluation criteria and tasks.
- d.) Maintain open and regular communication with the pilot group and the project team.
- e.) Document all sorts of changes, issues and concerns during the pilot phase to ensure that problematic areas can be fine-tuned and improved.

An evaluation process must be in place prior to deployment of WBT. The purpose of the evaluation process is to assess the effectiveness of the WBT system. This process should be able to identify what worked well and where improvements can be made.

The following are suggested WBT course evaluation areas:

- a.) Organization of the course contents and the knowledge flow
- b.) Clarity of presentation materials
- c.) Quality of interactive activities
- d.) Adequacy use of multimedia tools
- e.) Availability of communication channels, assistance and support
- f.) Overall satisfaction with the course

4. Deployment Phase:

Prior to deploying the course on WBT environment, one needs to set the tone for the environment.

The following are suggested items to be considered in implementing WBT:

- a.) To set the expectations of the learners in the use of WBT.
- b.) To explain to the learners and support staff the roles and responsibilities prior to the deployment.
- c.) To state the expectation of response from instructors and technical assistance
- d.) To consider a contingency plan for time when the technology is not available and alternatives should be identified for substitution.
- e.) To determine the deployment strategies such as limit the number of learner groups, types of WBT courses and where WBT is available for access.

SUMMARY

WBT has gained momentum in the colleges, universities and technical institutes in the recent years globally. Effective WBT requires carefully planned activities, systematic developed processes, manpowers and financial support to implement. Nevertheless with circumspectly concerted efforts of planning, WBT can be applied in many types of training with reasonable amount of time and effort. Learners can gain the flexibility to receive training at anytime and from anywhere.

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INDUSTRY PARTNERSHIP FOR GRADUATION STAGE OF HIGHER VOCATIONAL EDUCATION

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Abstract: Vocational education has been developing rapidly in China these years' Zhejiang University of Technology formulated a flowchart of industry partnership for the graduation stage in the light of characteristics and objectives of vocational education. After three years' experiment in industry partnership, the college has been successful not only in the training of students' ability of comprehensively applying what they learn into their work and in the training of their skill, but also in the preparation for their future employment. In this paper, the author makes a comparison between the traditional practice and the industry partnership in the graduation stage and, after analyzing their characteristics, concludes that the latter can achieve better results through strict management.

INTRODUCTION

Vocational education is a kind of education that aims to provide society with skilled workers for a specific job, to equip students with theories and skills essential to a position so that they will be qualified in their future work. With the development of industrialization, progress of technology and economic globalization and the resulting adjustment in industrial structure, higher vocational education has seen great development.

China drops behind in initiating higher vocational education, but it has seen drastic development in previous years. For example, in Zhejiang province, the number of students admitted to all kinds of vocational universities and colleges is increasing at an annual rate of about 30% since 1994 when the province made experiments in higher vocational education for the first time, 10-15% more than that enrolled in ordinary institutes of higher learning. The number of schools that engage themselves in higher vocational education increases from only ten-odd to more than forty, including all kinds of adult universities and colleges. Higher vocational education, being an important type of higher education in China, has won the approval of and support from people of all walks of life.

Enlightened by overseas advanced experiences in the pedagogical reform and practice on industry partnership, we put forward a program for industry partnership for the graduation stage of higher vocational education. Enterprises- and practice-oriented, the program was aimed to improve students' application ability and was listed into the school's pedagogical reform projects and launched in 1997.

THE PROCESSES OF INDUSTRY PARTNERSHIP FOR GRADUATION STAGE

According to our syllabus for junior college education, graduation work is scheduled in the sixth semester, i.e. the last semester, which lasts about 13-16 weeks. The students have completed common basic courses, technological basic courses and specialized courses and have taken part in all kinds of fieldwork, therefore they have grasped the basic theories and skills for a specific job or position or specialty.

In order to improve students' ability in combining theory with practice, we formulated a flowchart of industry partnership for graduation design as follows:

1. Mobilization meeting for industry partnership for the graduation stage

   Time: in the beginning of the fifth semester.

   Participators: College president in charge of teaching affairs and director of specialized teaching and research offices.

2. Consulting about industry partnership for the graduation stage.

   Time: in the middle of the fifth semester.

   Participators: Director of specialized teaching and research office and tutors of graduation work.

3. Projects of graduation design. The students have to find projects for their graduation designs and the teachers will contact the enterprises about such projects.

   Time: by the end of the fifth semester.

   Participators: Students and tutors.

4. Evaluation of the projects.

   Participators: Tutors of graduation design.

5. The teachers shall determine the content for graduation design on the basis of their engagements in scientific research or in their cooperation with school factories.

   Time: by the end of the fifth semester.

   Participators: Directors of specialized teaching and research office, tutors and college leaders in charge of the matter.

6. Determining the projects of graduation work and completing relevant tables and documents for instruction and other arrangements.

   Time: 1st week of the sixth semester.

   Participators: Students, tutors, director of teaching and research office and leader in charge of the matter.

7. Working out reports about the projects, literature and pedagogical materials related to the projects.

   Time: By the end of the 3rd week of the sixth semester.

   Participators: Students, enterprise and school tutors.

8. Working in enterprises and starting the graduation work under the instruction of enterprise tutors.

   Participators: Students, enterprise and school tutors.

9. Supervision and management by school tutors.

   Time: Not later than one week before the oral graduation examination.

   Participators: Students, enterprise and school tutors, and members of the oral examination group.

10. Graduation paper writing.

    Time: The last week.

    Participators: students, enterprises and school tutors.

11. Graduation work reporting, oral examination.

Participators: Enterprises and school tutors, and members of the oral examination group.

12. Grading.

Explanation about the flowchart:

1. Mobilization meeting for industry partnership for the graduation stage. The president-in-charge will give introductions about the forms, requirements and problems for attention in the graduation design with typical examples in previous years. Some enterprises will be invited to take part in the meeting. The students are required to strengthen contact with enterprises. They shall actively look for projects, solve all kinds of technical problems for enterprises, and participate in the product design and technical upgrading in those enterprises, thus making their contribution to the development of enterprises. To apply what they learn into their practical work can train them to improve their comprehensive quality. Through their efforts in looking for projects, the students can have a better understanding of enterprises and the industries to be engaged in. To take part in works in enterprises is the first step for them to enter into the society and is a preparation for their future employment. The president hopes that all of them can devote themselves to their works in enterprises.

2. Teachers of specialized teaching and research offices will push the students to take part in industry partnership, provide consulting services for them, offer suggestions and instructions to them, encourage them for their good ideas and correct the defects in their ideas.

   Our experiences show that teachers' continuous push is necessary in this period, for some students will be discouraged when they are refused by some enterprises, some are not brave enough to look for projects for themselves. We hold that students can have a better understanding of the society and promote for themselves in the process of looking for a project with their own efforts, which is the first step for them to enter into the society.

3. After a period of hard work, the students will finally be accepted in succession to work in some enterprises where they can be familiar with their projects, about the progress of which they shall make regular reports to their tutors. The tutors will help them to analyze the feasibility of working on such projects and make arrangements for technical preparation. Meanwhile the teachers will find other projects in some enterprises through certain channels, from which they can select projects for graduation work. The projects that the teachers find are mainly for preparation for the graduation work, and are usually announced to the students in the end of the fifth semester. The students can make their own choice with consideration of their interests and other factors.

   Our experiences tell us that not all the projects from enterprises are suitable for the students to work on and the projects are not enough for every student to have a project. So it is necessary for the teachers to select some suitable one from their own projects, or find some in the course of their contact with enterprises and make appropriate arrangements on the basis of each student's strong suit and the content of each project. In this way the graduation work will be able to carry out in an well-ordered manner.

4&5. Evaluation of the projects. Directors of specialized teaching and research offices and tutors will discuss and evaluate students' projects in terms of their types, difficulties and effectiveness before making final decisions. The projects will be classified as projects for graduation work, for technical preparation, for sub-projects and projects not suitable for graduation work. The decisions will be reported to the college for approval.

6. Relevant tables and documents for instruction and other arrangements shall be completed after the projects are approved by the college. The content of projects, goals and students' major work, detailed work arrangements, means and methods for examination and for

guaranteeing the quality of graduation work are initially determined.

7. Working out reports about their projects (gathering of literature and information related to the projects). The students shall get familiar with their projects' contents and requirements, draft up plans for the graduation work, sort out and gather materials related to their projects and work out reports about their projects. All these shall be finished in two weeks or in a shorter period when the students have made sufficient preparation.

8&9. According to regulations by the college, the enterprises which accept the students to work there on their graduation design are asked to appoint a tutor who is engaged in product development, management of production and technology with a professional title of engineer or higher. During their working in the enterprises, the students will work on their graduation project under the instructions of their enterprise tutors. The school tutors shall make necessary and timely contact with the enterprise tutors for information on the students' work and life and provide consulting services for the students. The students shall report to their school tutors about their progress in the enterprises, once a week in person for those who work in local enterprises, or once every ten days by writing or phone call for those who work in other places, so that the school tutors can check on their work and push them.

In order to find out students' progress in their work and their conduct in the enterprises and to guarantee the quality of graduation work, the college encourages and organizes relevant teachers and members of specialized teaching and research offices to go deep into the enterprises, which helps them to get information on the students' work and on the enterprises so as to set up or strengthen relationships with enterprises.

10. Writing graduation paper or design report. After they complete all the requirements about their graduation projects and have the approval from their tutors, the students can begin to write the graduation paper or design report. The paper or report is one of the main indexes to evaluate the students' achievements, so the students shall work hard not only to present a well-written paper or report which provides sufficient evidences and precise analysis to support the ideas, but also to submit installations for the project, photos evidencing the technical upgrading, the device itself and primary data and evaluations on the device's practicality, reliability, expected social and economic results.

11. Oral graduation examination. Strict examination procedures and systems are guarantees for teaching quality in the graduation stage. The industry partnership enables the students to make full play of their initiatives and to plunge themselves into their projects. The enterprise tutors are asked to take part in the students' oral graduation examination and offer their comments in written forms. The students are required to present their installations or pictures of such installations and to report about the effect and operation of such installations.

12. Grading. In grading, we put more emphasis on students' skills in practical work, the actual results of the projects and the evaluation given by the enterprises than their theoretical level because of the characteristics of vocational education.

COMPARISONS WITH ORDINARY ENGINEERING MAJORS IN THE GRADUATION STAGE

1. For higher vocational education, the goal of industry partnership for graduation stage is to enable the students to be familiar with and adapt to the practical works in modern enterprises. The students are supposed to work on the production front, to engage in and solve all kinds of technical problems arising in production. Their graduation works are more closely related to industrial production than that of ordinary engineering majors.

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2. Industry partnership requires the students to be on the spot so that they can learn from the technicians and set out to work under their instruction. Through working on projects closely related to production, the students are able to adapt themselves to the work method of modern enterprises and improve their abilities in analyzing and solving problems. However, ordinary engineering majors usually finish their graduation design and paper in laboratories through means of theoretical analysis, simulation and emulation, so the training of practical work ability tends to be ignored.
3. Vocational students taking part in industry partnership focus on product design, equipment and technical grading and application of matured technology while ordinary engineering majors pay more attention to the application of new technology, development of new products and new technologies. The former serve for front production and the latter for technical reparation and progress.
4. The industry partnership for the graduation stage requires more of a teacher who is supposed to be familiar with production and to know everything about product design, equipment and technical process in addition to theories. However, teachers of ordinary higher education are usually more suitable to work in the field of development and application of new technology, serving for technical progress and preparation.
5. Difficulties in choosing graduation projects. Students taking part in industry partnership for the graduation stage are required to look for projects for themselves, so it is quite normal that not all the projects they find are suitable for them to work on as graduation projects. Some of the projects are from enterprises located far away from the school, making it difficult for the students to go between the enterprise and the school. Some of the students would like to finish their projects independently and refuse to cooperate with other students. All these create difficulties for every student to have a project.
6. Difficulties in management. Our three years' experiences in industry partnership show that industry partnership brings up many difficulties in management though students have more opportunities to choose projects. Some of the students may have been engaged in works dealing with the graduation projects months ahead of schedule while others may not be able to find one when the scheduled graduation design is about to begin.

REWARDS FROM INDUSTRY PARTNERSHIP FOR GRADUATION STAGE

1. The industry partnership for the graduation stage enables the students to make full play of their initiatives. In the practical work environment, the students are able to improve their social ability and work ability, thus making effective and adequate preparations for future employment.
2. The industry partnership helps check the students on their grasp of theory and skill, and improves their ability in applying the theories into practice and in work skills.
3. The industry partnership strengthens the association between the school and enterprises, especially when the students win the commendation from the enterprises with their achievements. By means of industry partnership, the enterprises have a better understanding of students, thus laying a foundation for the students' future employment.

Through three-years' practice, we find that industry partnership for graduation stage of higher vocational education is practicable and therefore shall be popularized. The industry partnership not only conforms to the objectives of higher vocational education, but also helps improve students' ability in practical work, in applying theories , in social work and

in preparing for future employment in an efficient way.

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